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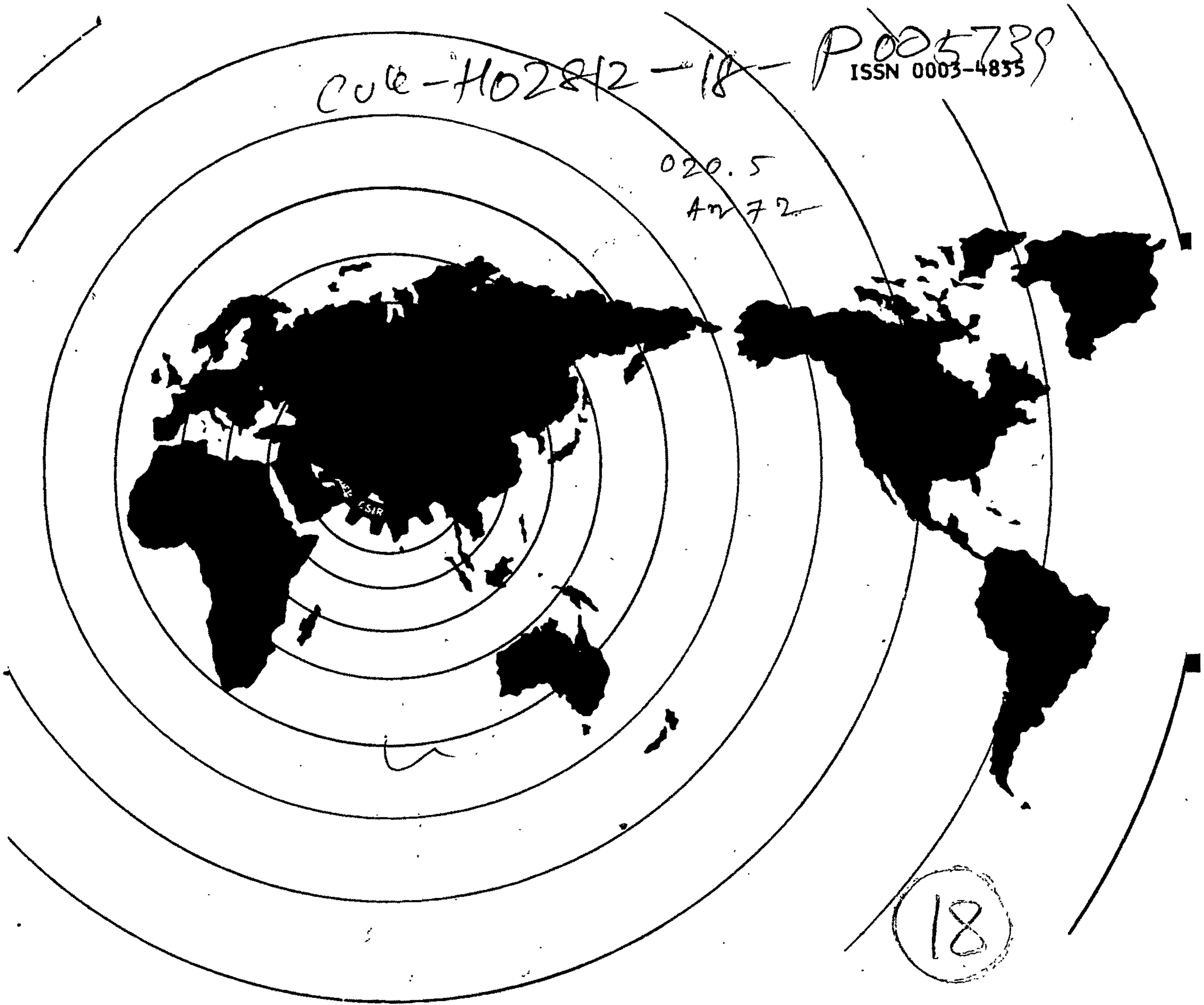

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THE UNESCO COMMON COMMUNICATION FORMAT

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Unesco's Common Communication Format (CCF) like other exchange formats enables free exchange of bibliographical records within information community. To make it more effective, efforts should be for making conversions in existing formats and their easy availability. Studies the CCF in relation to other formats like UK MARC, AGRIS, INIS and MEKOF-2.

INTRODUCTION

The Unesco Common Communication Format (CCF)[1] is an exchange format intended for use by agencies within the information community which wish to exchange bibliographic records with one another. It is intended particularly for those agencies which have records of monographs and serials, library type materials, as well as records of journal articles, contributions in proceedings and other parts of physical documents which constitute intellectually independent entities; these records tend to be created by abstracting and indexing services.

An exchange format consists of three components:

(a) Rules for the arrangement on a computer storage medium of data to be exchanged (including rules for the size of the physical storage medium).

(b) Codes to identify the different data elements in the record (e.g. author, title, scale of map, starting date of journal).

(c) Rules for the formation of different data elements, very closely tied up with (b). The data elements separately identified by the code in the exchange format have to be defined, not only in terms of content but also in form, if the records are to be suitable for use by another agency.

Effective exchange among agencies can be accomplished only if the records of the agencies conform to (a), (b) and (c).

In respect of the first component, there exists a standard format for the exchange of data on magnetic tape which has been established by the International Organization for Standardization, ISO 2709[2]. Universal acceptance of this standard has helped the information community enormously. It is accepted for the exchange of data on magnetic tape, and it is also being used for the formating of bibliographic data sent on-line down the telephone.

The second component relates to the tags, indicators and subfield codes, in short, codes which define the different data elements in the record. There is no universally accepted standard for these. One reason why they vary among different implementations is that agencies have different requirements in respect of the data they wish to exchange. Most countries, for example, have found it necessary to develop their own national MARC formats, and there are also formats developed by or specifically intended for abstracting and indexing services. They all embody different schemes of tags and other identifiers.

The last component, the form and content of the data elements, varies according to the cataloguing rules used as well as according to the way the different data elements prescribed by the rules are divided up and separately identified.

The Common Communication Format implements ISO 2709 in full. It has its own system of tags and other identifiers for the identification of data elements, but it does not assume any particular cataloguing code. This point will be elaborated later.

HISTORY AND DEVELOPMENT

The Common Communication Format has been developed by a group of experts convened by Unesco and working in the context of the Unesco General Information Programme. In 1978, the International Symposium on Bibliographic Exchange Formats[3], sponsored by Unesco took place. Unesco was interested in this topic, because they had received a large number of requests from agencies around the world for advice on setting up national or regional bibliographies. When recommending which format a system should use, experts were encountering difficulties, since format were divided, roughly speaking, into two categories: those used by national libraries, the MARC family of formats, and those used by abstracting and indexing services, which, though more diverse, were to a certain extent exemplified by the UNISIST reference Manual format [4]. This format had been developed jointly by Unesco and the International Council of Scientific Unions Abstracting Board (ICSU-AB), because the need was felt for standards and guidelines for secondary services considering the automation of their databases. The international symposium addressed itself to the problem of the existence of the two categories of format which reflected the two different information communities, libraries and secondary services. It was clear that in the future, at the level of standardization of bibliographic records, there had to be more cooperation if the needs of the end user, for example, a research worker wanting articles on a particular subject, and then the serials in which they were to be found, were to be satisfied. Researchers find references to articles in the databases of abstracting and indexing services, but have to go to a library to find the appropriate journal or monograph.

The symposium resolved to attempt to break down the barriers between the two information communities. One way to contribute towards this was the devising of a format which would be directed specifically to neither community and could be used by any agency which was providing records to both the communities. The Ad-hoc Group on the Establishment of a Common Communication Format was convened. The members firstly requested that Unesco commission of data element directory taking into account the data elements of various international exchange formats, including UNIMARC[5], USSR/US Common Communication Format, MEKOF (the format of the CMEA countries[6], the format of the International Serials Data System[7], and the Reference Manual. A consultant prepared a KWOC index to the data elements in the formats and an abbreviated data element definition for each data element. These became the basis for the discussions which revolved around the definition of a mandatory core set of data elements. Optional data elements were then added to make possible the carrying of complete bibliographic records in the format. However, it quickly became clear that for the format to be accepted it would not be possible to prescribe exactly the form and content of each elements although it was possible to be precise in some data elements such as those whose form and content were prescribed by other standards, such as the standard numbers (ISBN and ISSN) and key title. Sufficient consensus could not be obtained in the case of other data elements. That could never be achieved without internationally accepted cataloguing rules, which are still something for the future. So, when the Common Communication Format was published by Unesco in the middle of 1984, the representation of many of the data elements was specified as being 'in accordance with the particles of the agency preparing the record', which means each agency according to its own cataloguing rules. Thus, an agency receiving a record in the CCF would need to know the rules used by the source agency in order to determine whether it was worth taking these records. That is not to say that records created according to different rules would be of no use at all to a receiving agency. Being in the same Common Communication Format and therefore having the same identifiers, records can easily be interpreted by the computer programs of a receiving agency. They can be used to find out what an organization has in terms of its book stock, assuming that the records originate from a library, or they can be used to produce current contents lists of journals, for example, if the records originate from a secondary information service. They can be added to on-line databases, though the absence of common rules for access points may make information retrieval a little more difficut and less efficient. It is when such records from different sources prepared according to different cataloguing codes are merged into a database with a view to producing a printed product such as a ctalogue that problems arise. Records created under different rules cannot be easily filed together in a printed product. There do exist the International Standard Bibliographic Descriptions[8] which ensure uniformity in the descriptive area of the record, but we are still looking forward to the day when there are universal standards for the form of headings.

THE CCF AND SOFTWARE

The Common Communication Format is not of course an end in itself. Unesco was interested in its establishment as a means to an end. The format has to enable the exchange of records among different agencies throughout the world and between developed and developing countries. To be useful, what is required is a pool of records which can be drawn on by agencies to avoid their having to catalogue of their own records themselves, working on the same principles as the cooperative cataloguing projects found in some countries. For this to be effective, it needs a number of agencies, all provided with compatible software for data entry and information retrieval, and using a common format, at least for exchange. In an ideal situation, they would use the same cataloguing rules, but as yet this is not feasible. The Institut fur Maschinelle Dokumentation in Graz, Austria, is developing a software package known as IV+V. Unesco is interested in this software package, since it can be applied to bibliographic information retrieval and has offered advice on the requirements to make it suitable for use in developing countries for organizations wishing to exchange records with one another. Therefore, one of these requirements is the facility to provide data output on a computer-readable medium formatted to the provisions of international exchange formats. Exchange formats do not usually specify how data are to be input and the CCF is no exception. Therefore, an implementation manual is needed to enable the creation of bibliographic records for entry into the system. This manual has to make data entry as easy as possible, which is very important if it is to be used by cataloguers far removed from the help of fellow professionals. Most importantly, the data entered must be capable of being transformed into the output as prescribed by the exchange format, for it to be useful to recipient organizations. At one extreme, data could be entered in the form exactly as required by the exchange format. This would cause difficulties in data entry. As mentioned above, the Common Communication Format is independent of any cataloguing code. To a cataloguer, however, a cataloguing code is a very important element in record creation, and so the format must be related to the code. Therefore, an implementation manual aimed at cataloguers has to be related as closely to the cataloguing rules as it is to the exchange format. UK MARC [9], for example, contains against each data element the relevant AACR[10] section number. The first implementation manual using the CCF will take AACR for its cataloguing rules, since AACR is one of the most widely used codes. However, AACR does not address all the conditions encountered especially by secondary services (Chapter 13 is not very detailed and is very much in the library tradition). Therefore, extra guidance has to be given, so that the manual can be used to create records which are compatible with AACR, but which will be acceptable in abstracting and indexing publications.

DESIGN OF THE IMPLEMENTATION MANUAL

The implementation manual enabling the entry of data in a format compatible with the CCF has required a different approach from that taken in data entry manuals for systems using other formats.

One reason for this is that most exchange formats such as national MARC formats have been developed simultaneously with their input format, and with particular cataloguing rules in mind. Therefore, the format corresponds very closely to the requirements of the cataloguing rules. The same goes for the exchange formats of abstracting and indexing services like AGRIS[11] and INIS[12]. They too are closely related to the input format and the cataloguing rules used. Users of the CCF are not, however, using a format designed with any regard for their data entry procedures. This causes problems which can be overcome by the software being designed to convert the data. The manual must, therefore, be directed towards the cataloguing rules and the input procedures rather than the exchange format.

In practice, cataloguers do not enter bibliographic data in the form in which it appears on an exchange tape. They usually enter data on a worksheet next to the tag to which they relate. On the ISO 2709 exchange tape, tags are held apart from the data to which they relate. The tags are associated with their respective data not by location but by means of pointers, strings of numbers held in a part of the record called the directory[13]. Although these numbers are easily calculated by the computer, they are difficult for a human being to calculate. Therefore, they are never input by the cataloguer. Nevertheless, in many formats, the cataloguer finds the codes on the worksheet, the tags, in numerical order, because they, unlike the pointers in the directory, were designed with an eye on input.

The order of the tags in the CCF is not based on the order in which a cataloguer using AACR enters data. The development of the CCF concentrated on making the format compatible with other exchange formats, perhaps at the expense of making the format suitable for data entry as it stands. The CCF also includes a sophisticated record-linking technique which requires complex codes which the computer rather than the cataloguer should enter. Its record structure was devised to enable record-linking; this involves the analysis of records into their different bibliographic levels to a much greater extent than cataloguers have taken the analysis in more traditional cataloguing systems. This kind of record structure has only recently become feasible within the context of ISO 2709, since an extension to the directory incorporated in the second edition enabled pointers to group together parts of records into what the CCF calls 'segments'. This greater conceptual gap between the exchange format and the cataloguer's practice has made the development of an implementation manual for data entry amount to the development of a new format. Incidentally, had it not been geared to just one cataloguing code, the resulting manual would have been unwieldy and cumbersome to use.

THE CCF AND OTHER FORMATS

Why do we need another exchange format when we already have UNIMARC and the RM, not to mention national exchange formats, is a not infrequent criticism levelled at the CCF. However, both these formats cater really well for only half the information community. UNIMARC is ideally suited to serve the national libraries with their own national formats which wish to exchange records among themselves. Were it not for UNIMARC, exchange among national libraries would have to take place in every instance on a bilateral basis, with conversion programs being written between every pair of formats among which exchange was taking place. An alternative would be for everyone to use one national format, for example, US MARC, but if that method were chosen, there would be an international outcry every time the national format chosen was changed, since it would mean adjustments to everyone else's programs. UNIMARC is sufficiently close to the majority of, if not to all, MARC formats to avoid complicated conversions between it and the national MARC formats, and it can be changed only by international agreement. The main disadvantage of UNIMARC is that it is biased, naturally, towards library material and there is no easy way to link the record of an article to the record of the serial containing it, for example. AACR-type analytics which consist usually of an access point for a work published elsewhere, even when it is contained in a volume with other works, are no problem, but anything more complex becomes a little unwieldy. The Reference Manual specifically addresses this problem, but finds the solution to it in a way which belongs to the days when tapes were not only the sole medium for exchange but were also much used in textual data processing for storing data where disks would be used today. Each bibliographic level constituting an item which someone might wish to retrieve has its own record, and within the same record are all the details as to the monograph, collection or serial in which it is found. Thus, there will be an abbreviated serial record in every record of a contribution within that serial. The data elements in the total record are identified by tags which indicate the bibliographic level of that data element. Thus, the title of a monograph has a different tag from the title of a serial and the same goes for author, collation details, etc. In a database organized in this way, there would be a great deal of repetition; on an exchange tape it does not matter so much; indeed knowing that every record is complete makes processing easier.

The CCF on the other hand does have a mechanism to take care of record linking[14]. It can link records at separate bibliographic levels which when added together constitute the record of a bibliographic item; or it can link records with different kinds of relationships, such as a serial title to its former title and vice versa, or a work to its translations. The linking mechanism has been so devised as to be flexible. It had to be flexible to be able to be compatible with the complex mechanism of UNIMARC and the 'flat' record structure of the Reference Manual, which assigns a different tag to a data element, depending on whether it is at the analytic, monographic serial or collection level. Conversion between the CCF and MEKOF was also taken into account: although the record structure of MEKOF is 'flat', it uses a five-digit tag to enable one digit to indicate consistently the bibliographic level of the data element. However, the flexibility with which the CCF is endowed means that users have to beware: they must ensure that they themselves use the mechanism in a consistent way or else recipients of the records may not have built into their programs the correct mechanisms to decode the particular mechanisms used. Moreover, the records are split into 'segments' which point to other records, so it is necessary to ensure that all the little bits of a record are exchanged together. Thus, housekeeping procedures have to be developed between parties to an exchange before exchange can take place and at the moment there are no guidelines on these.

Consequently, there is still room for all three international exchange formats which have been mentioned in this paragraph – MEKOF is regarded as regional rather than truly international; and there is no question that AGRIS and INIS should give up their formats which have been devised with a particular system in mind.

THE FUTURE

The important aim of all exchange formats is to facilitate the free flow of information, in this case bibliographic references. For this to be achieved, probably the most important thing is for computers to be able to talk to each other, which is something to be achieved by experts outside the library and information community. After that what is required are internationally-agreed forms of headings, or authority files. At the same time, more effort should be put into making conversion among existing exchange formats (and here the national formats are included) and making them readily available. Then the CCF would indeed be an effective bridge between the library community and the information community and would certainly gain popularity as a format on which to base an internal format for the databases of both library systems and secondary services.

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4. Martin M D: Reference manual for machine-readable bibliographic descriptions. Paris: Unesco, 1974, (SC. 74/WS/20). 2nd ed., edited by H Dierickx and A Hopkinson. Paris: Unesco, 1981. (PGI/81/WS/22).

5. UNIMARC: Universal MARC Format. London: IFLA International Office for UBC, 1977.

6. International interchange format – MEKOF-2: specification of data elements. Moscow: ICSTI, 1977 (Official English translation).

7. ISDS manual. Paris: Unesco, 1984.

8. International Standard Bibliographic Descriptions, published by the IFLA International Office for UBC covering monographic publications, serials, non-book materials, cartographic materials, antiquarian materials and printed music; there is also an ISBD general, a framework which governs the structure of the other ISBD's.

9. UK MARC manual. 2nd ed. London: British Library Bibliographic Services Division, 1980.

10. Anglo-American Cataloguing Rules. 2nd ed. London: Library Association, 1978.

11. Most exchange format documentation contains at least one illustration of a record in ISO 2709 structure. See for example reference manual. op cit, p.4.27.

12. CCF. op cit. p.19-24.

For background information to the other bibliographic exchange formats mentioned see:

(a) Long, Anthony: UK MARC and US/MARC: a brief history and comparison. Journal of Documentation 1984, 40(1), 1-12.

(b) Hopkinson, Alan: International access to bibliographic data: MARC and MARC-related activities. Journal of Documentation 1984, 40(1), 13-24.

ABBREVIATIONS

AGRIS - Agricultural Information System of the Food and Agricultural Organization of the United Nations.

INIS - International Nuclear Information Systems of the International Atomic Energy Agency of the UN.

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THE UNISIST REFERENCE MANUAL FOR MACHINE-READABLE BIBLIOGRAPHIC DESCRIPTIONS WITHIN THE CONTEXT OF INTERNATIONAL EXCHANGE FORMATS

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INTRODUCTION

Reference Manual for machine-readable bibliographic descriptions[1] is the official title of the Unesco publication which is the subject of this article. It is often referred to as the UNISIST Reference Manual because the first edition (1974) was one of the products that were conceived during the 1961 UNISIST Conference held under the joint auspices of Unesco and ICSU-AB (International Council of Scientific Unions - Abstracting Board)[2].

In this article the history of development, purpose and intended users of the Reference Manual will be sketched. Its main features will be outlined and its future within the framework of other international exchange formats will also be discussed.

HISTORY AND PURPOSE

As already mentioned the original 1974 edition was prepared by the UNISIST/ICSU-AB Working Group on Bibliographic Description, set up in 1967 as one of the working groups to study matters in connection with the then proposed establishment of UNISIST ((2), pp. 93-94)). Before publication of the first edition, a draft was tested in 1972 by the Department of Information Studies, University of Sheffield, UK, in consultation with an international group of libraries and secondary information services. The results of this test and of further discussions in the Working Group were incorporated in the 1974 edition, which was compiled by David Martin, then at Inspec, now at the British Library. In 1976 the UNISIST International Centre for Bibliographic Descriptions (UNIBID) was established by the British Library in collaboration with Unesco, within the framework of the UNISIST programme, with the major objective of revising the first edition and handling its future updating and promotion. The second edition, published in 1981, is the result of this revision, carried out in close consultation with Unesco's Division of the General Information Programme (PGI) and an Advisory Committee of actual and potential users. Alan Hopkinson and the author of this article, both at UNIBID until 1982 when it was transferred to PGI, Unesco Headquarters, Paris, were the compilers and editors of the new edition.

Although during the initial UNISIST discussions the Reference Manual was conceived to serve the entire library and information community, it is fair to say that what actually emerged had a strong bias towards the requirements of abstracting and indexing services. Nevertheless, the Reference Manual did provide the essential elements for an adequate description and identification of bibliographic items, but not necessarily to the fullest possible formal standards required by-say- some national libraries.

The creation within Unesco of the new General Information Programme in 1977 to deal with libraries, information services and archives in an integrated fashion, influenced the general direction of the second edition. Data elements were added to make the Manual more hospitable to a wider circle of users, including libraries, and the fact that it could be used by manual as well as automated systems was stated more explicitly.

MAIN FEATURES

Exchange or Input Format?

Before commenting on this particular point it is necessary to make clear what is to be understood respectively by the terms *exchange* or *communication format*, *internal* or *processing format*, and *input format*.

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* *Responsibility for the contents of this article is strictly that of the author and not of the Institute of Social studies.*

Any machine-readable bibliographic format comprises four basic elements: (i) a carrier format or record structure[3], (ii) content designators such as field tags, subfield identifiers etc., (iii) data element names and definitions, and (iv) defined data element sets to be used to describe particular types of bibliographic items. The distinction between an internal or processing format, and a communication or exchange format, is mainly functional and is most noticeable in the form the carrier format takes. In an *internal format* the form of the record structure must be such as to allow for maximum efficiency and economy in computer processing, whereas the record structure of an *exchange format* must be - so to speak - "logically transparent", that is to allow for the unambiguous identification of discrete data elements for automatic conversion from the exchange to a variety of local internal formats and vice versa.

Whereas the terms exchange and internal format defined above relate more specifically to aspects of machine readability and manipulation, the term *input format* is applicable to both automated and manual environments and relates more specifically to the intellectual and display aspects of manual or on-line bibliographic description and cataloguing. More precisely, the input format is the prescribed form in which bibliographic items are recorded on an input sheet or via a terminal screen. In many cases this format is different from both the internal and the exchange format and also from a fourth format which may be distinguished, i.e. the *display format* for printing purposes.

One of the interesting things to note about the Reference Manual is that, although conceived in principle as an exchange format, in practice it has also been used as a source for local bibliographic description manuals and as an internal format. The latter is perhaps to be explained through the circumstance that, during the first years after publication, magnetic tape was still more used as exchange and storage medium than is the case now. The record structure of the Reference Manual being essentially a tape format, the practice of using that structure also as an internal format may have come fairly natural. Most new users would probably no longer do this. When used as a bibliographic description manual, it should be realized that this is to be understood literally, i.e. the Manual, although containing the essential elements necessary for cataloguing, stops short of any precise rules; it is only concerned with those for bibliographic description[4]. Although not necessary intended that way at the beginning, this versatility of the Reference Manual has proved to be an advantage : indeed, every exchange format to be effectively used needs development of a compatible local input or implementation format. The fact that the Reference Manual already contains the elements necessary for bibliographic description makes this task easier and promotes standardization of local input formats.

It should be mentioned that exchange formats that are actually used, if not containing description rules from the beginning, show a tendency to evolve in that direction. To quote only a few examples : the INIS[5] and AGRIS [6] formats, like the Reference Manual, included such rules from the start. The UNIMARC format[7] originally contained very little or no explicit guidance for description or cataloguing, perhaps because it was assumed that the intended users would all implement fairly standard MARC-AACR rules. Given the diversity in local MARC and AACR implementations it soon became apparent that standard use of UNIMARC required drafting of a so-called interpretative or implementation manual[8]. The CCF is taking the same course. As can be read in Alan Hopkinson's article[9], an implementation manual is in draft which will not only give description rules but which will also contain a specific implementation of AACR II.

Use of Bibliographic Levels

Another significant feature of the Reference Manual is its explicit use of bibliographic levels.

The formal distinction of several levels of bibliographic description facilitates identification as well as linking of sub-records belonging to a composite record. This makes it possible to describe parts of bibliographic items which may be considered as intellectually distinct although physically part of a larger item. For example, if it is desirable to draw the attention separately to one, several or all the chapters of a report which is itself a volume in a report series, it is necessary to cite all the bibliographic details to identify the individual chapter(s) as well as the volume and the series in which the volume is published. These three sets of descriptions, in the same record, may be said to correspond to three different bibliographic levels : the analytic, monographic and serial level respectively. A collection level can also be distinguished.

Furthermore, the distinction of the different possible combinations of bibliographic level in conjunction with the different types of bibliographic entity simplifies input procedures. The Reference Manual contains tables which show essential and supplementary (optional) data elements for each relevant combination of bibliographic level(s) and type of document, which can be translated into different corresponding input forms. This means that cataloguers only have to distinguish bibliographic level(s) and type of document related to the item in hand to enable them to choose the appropriate input form which then gives them specific guidance on the bibliographic details to be entered, whether manually or on-line. To some extent this "automates" the intellectual part of input.

The following definitions are an abbreviated form of those given in the Reference Manual :

The Analytic level

The analytic level of a bibliographic record describes an item which is part of a larger work and which cannot be described and identified adequately without reference to one or more of the other inclusive parts of the larger work in which it is contained. This is the case, for example, for a chapter in a monograph, an article in a journal issue.

The Monographic level

The monographic level of a bibliographic record describes an item which can be considered as a self-contained bibliographic entity, i.e. it can be identified and described without reference to another bibliographic item. Typical examples are : a book (monograph), a report, a thesis.

The Collection level

The collection level of a bibliographic record describes an item which is composed of at least two but usually of more individually entitled works, but which consists of a definite number of constituent works. An example of a collection is all the works of one author republished in one or more volumes. The component parts of a collection may be described at the monographic level, possibly in combination with a further analytic level.

The Serial level

The serial level of a record describes a bibliographic entity which is issued in successive parts, usually but not necessarily having numerical or chronological designations, and intended to be continued indefinitely. Examples are : journals, monographic series. The component parts of a serial or series may be described at the analytic and/or monographic level.

The essential difference between a collection and a serial or series is that the former is composed of a finite number of items, whereas the latter is meant to be open-ended. In practical cataloguing the difference is not important and some users of the Reference Manual, therefore, use the same fields for both the serial and the collection level of records. In the second edition of the Reference Manual the distinction was made more explicit for the sake of theoretical and terminological consistency.

Record Structure

The carrier format or record structure (record format) of the Reference Manual is a specific implementation of the International Standard *ISO 2709: Documentation - Format for bibliographic information interchange on magnetic tape*[3]. The ISO bibliographic information exchange record is divided in three sections : a fixed length label (leader) of 24 characters, a variable length directory, and data fields of variable length. The directory indicates the physical position on the tape of the data fields which may or may not be preceded by indicators and which may or may not be divided into subfield. The option chosen for the Reference Manual is fields preceded by two one-character indicators and divided into subfields preceded by two-character sub-field identifiers. It should be noted that the three-character field tags are not immediately preceding the fields which they identify but are located in the directory entries which define the position of the fields on the tape. Figure 1 shows the ISO 2709 - 1981 record structure. The Reference Manual record structure incorporates field alternative[4].

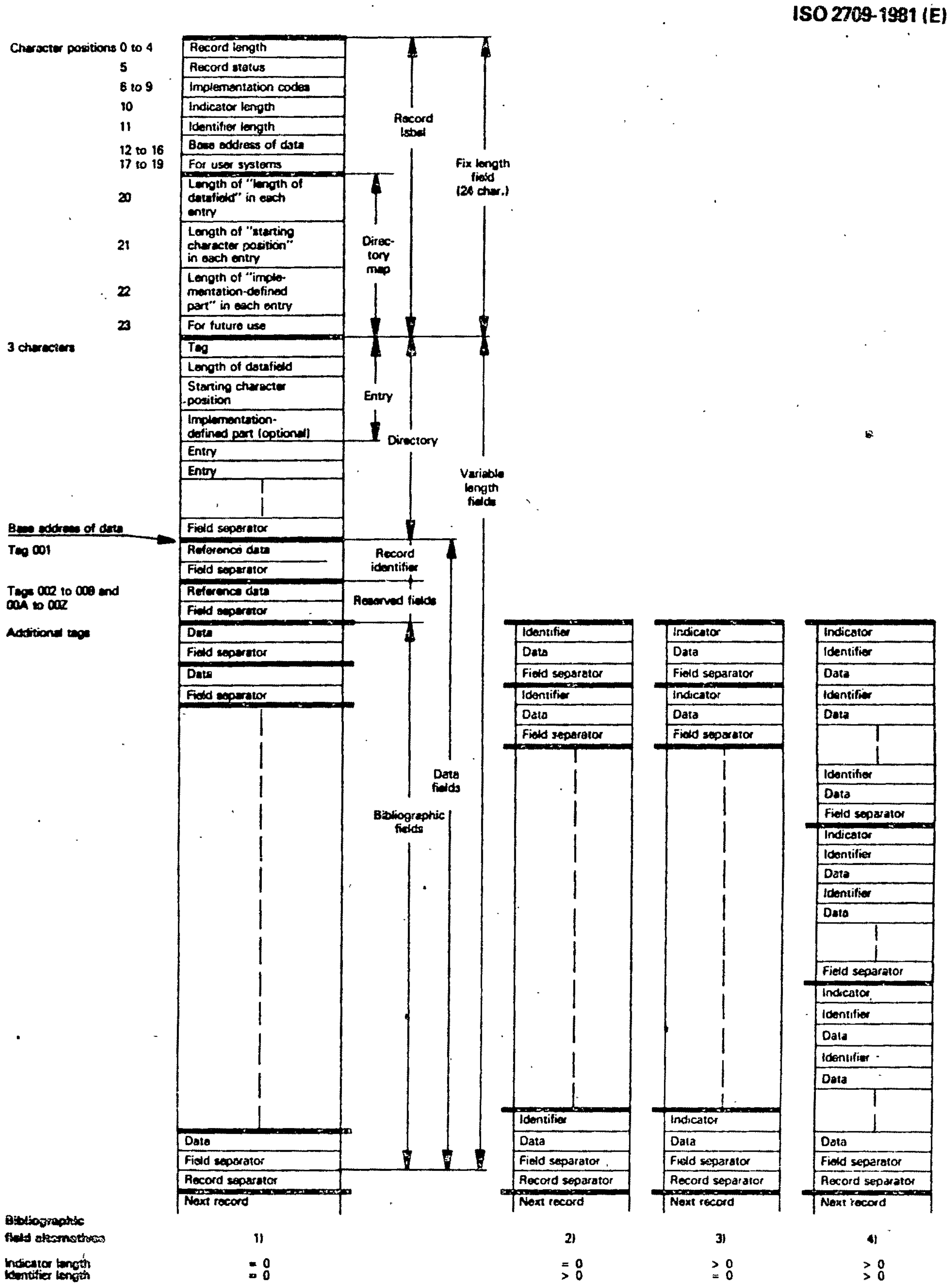
ISO 2709-1981 (E)
Character positions 0 to 4
5
6 to 9
10
11
12 to 16
17 to 19
20
21
22
23
3 characters
Record length
Record status
Implementation codes
Indicator length
Identifier length
Base address of data
For user systems
Length of "length of datafield" in each entry
Length of "starting character position" in each entry
Length of "implementation-defined part" in each entry
For future use
Tag
Length of datafield
Starting character position
Implementation-defined part (optional)
Entry
Entry
Record label
Fix length field (24 char.)
Directory map
Entry
Directory
Variable length fields
Base address of data
Tag 001
Tags 002 to 009 and 00A to 00Z
Additional tags
Field separator
Reference data
Field separator
Reference data
Field separator
Data
Field separator
Data
Field separator
Record identifier
Reserved fields
Data fields
Bibliographic fields
Data
Field separator
Record separator
Next record
Identifier
Data
Field separator
Identifier
Data
Field separator
Identifier
Data
Field separator
Record separator
Next record
Indicator
Data
Field separator
Indicator
Data
Field separator
Indicator
Data
Field separator
Record separator
Next record
Indicator
Identifier
Data
Identifier
Data
Identifier
Data
Field separator
Indicator
Identifier
Data
Identifier
Data
Field separator
Indicator
Identifier
Data
Identifier
Data
Data
Field separator
Record separator
Next record
Bibliographic field alternatives
1)
2)
3)
4)
Indicator length
Identifier length
= 0
= 0
= 0
> 0
> 0
= 0
> 0
> 0

Figure 1

The main difference between the 1973 and 1981 edition of ISO 2709 is the presence in the later edition of the (optional) implementation-defined part in the directory. This additional element in the directory entries allows the inclusion of information on the individual fields in the directory, which was not possible in the previous edition. The 1981 edition of ISO 2709 now allows, for example, to indicate in the directory the bibliographic level of each field. Had this facility existed when the Reference Manual was first published, the single-level tagging structure (a different tag for the same data element at different bibliographic levels) would probably not have been adopted. Because of the new facility created in the 1981 edition of ISO 2709, the editors of the second edition of the Reference Manual proposed to replace the single-level tagging structure by a multi-level tagging structure (the same tag for the same data element at any bibliographic level). The Advisory Committee did not wish to follow them on this point, presumably because this would have looked too much of a change for the existing users and would have implied some complication at the level of exchanges between new and existing users. The change would not have been of any fundamental nature but it would have meant, if only a minor simplification for new users, at least a means of doing away with the present anomaly of also having a number of multi-level tags for no apparent good reason except limiting the overall number of tags.

The CCF[10] has taken advantage of the fourth element in the directory for indicating bibliographic levels and for its linking techniques. The CCF no doubt has the most comprehensive and explicit methodology for linking separate records as well as fields or component parts (bibliographic levels) within records. On the other hand, it remains to be seen whether this methodology may not prove to be difficult to implement at the cataloguing stage. The Reference Manual method of linking bibliographic levels implicitly within records by means of tag differentiation (single-level tagging structure), and separate records by means of a cross reference in the A90 field may turn out to be easier for the cataloguer. Linking of fields within Reference Manual records is at present concerned but this method is less flexible than the CCF equivalent facility. A more convenient solution might consist of creating a new field for this purpose. It would appear in any case that the linking techniques of both formats are compatible, although the conversion programs involved at the exchange level would probably be rather complex. Given the fourth element in the ISO 2709 directory, it should be possible to amend the Reference Manual to incorporate the CCF linking facilities but, in the opinion of this author, this should not be done before the CCF methodology has proven itself as a widely adopted solution showing considerable practical advantages over the Reference Manual approach. Perhaps the caution of the Advisory Committee towards introducing new linking techniques was a wise decision at the time.

Summary of Contents and Practical Arrangements

The Reference Manual is distributed as a bound publication but pages are detachable and are perforated for easy insertion in a loose-leaf binder. This makes it possible to up-date continuously with amendments, additions etc. Since publication in 1981, a first set of amendments has been prepared and is available upon request, as well as the Manual itself, from Unesco, Division of the General Information Programme, Section for the Promotion of Methods, Norms and Standards, in Paris. When ordering the Reference Manual for the first time, it is recommended to ask also specifically for the updates since these are not automatically added. The Manual is available free of charge.

The *Introduction* is a succinct statement of the purpose, intended users and philosophy of approach, as well as a brief guide on how to use the Manual. *Part 1* explains basic concepts and includes matrixes of all data elements and their mandatory or optional status depending on the type of document they are meant to describe and the applicable bibliographic level. Systems analysts and programmers find these matrixes a particularly useful feature. *Part 2* gives names and detailed definitions of all data elements and, when relevant, how the element is to be selected and entered. *Part 3* describes the record format (carrier format) which is used for the Reference Manual and which is an implementation of ISO 2709. It also defines character sets, transliteration rules, magnetic tape standards and deals with other aspects primarily related to computer processing. *Part 4* shows a number of examples of complete bibliographic records prepared in accordance with Reference Manual specifications : reproductions of title pages as well as citations of the works as they would appear in a bibliography, abstracting journal etc., and a simulation of the way in which these records would be structured on a magnetic tape, are given. *Part 5* is a set of comprehensive guidelines for providing documentation on individual implementations of the Reference Manual.

Wherever possible the Manual recommends the use of standards issued by the International Organization for Standardization(ISO).

THE FUTURE OF THE REFERENCE MANUAL

The present situation

An article by the present author published in April 1983[11] anticipated that the Reference Manual, in conjunction with a portable software, would be an integral part of a comprehensive bibliographic information processing package that would be promoted by Unesco for use by libraries and documentation centres in developing countries (not excluding use elsewhere). The package would be primarily aimed at users of microcomputers and the portability of the software would allow freedom of choice of hardware. In reality, things have not developed quite in that way. The main reasons for this are the publication in 1984 of the CCF and the fact that the UNISIST International Centre for Bibliographic Descriptions (UNIBID) was only nominally transferred from the British Library in London to Unesco in Paris, i.e. without its staff. To maintain and promote effectively both the Reference Manual and the CCF seem to be a task beyond the resources of Unesco's Division of the General Information Programme. The present policy of Unesco appears to go into the direction of promoting and maintaining the CCF in the first place, while at the same time giving some limited support to developing a comprehensive bibliographic application based on the Reference Manual and the IV+V software[12] by an outside institution and without any outspoken commitment to maintain the Reference Manual.

As a note in the margin it may be observed that the discontinuation of UNIBID, the logical outcome of the competition between various standards in the field of (international) exchange of bibliographic information sponsored by various leading national and international organizations in this field, has been most unfortunate. UNIBID, together with the International Office for UBC, could have worked towards a gradual harmonization of ISBDs, AACR, Reference Manual, UNIMARC and CCF, possibly resulting in a CCF that would be a real "bridge" between the library world and the other parts of the information community. The current version of the CCF is a bridge with still a few holes in the bottom. For example, the flexibility allowed in the treatment of title and statement of responsibility may mean loss of information for users of MARC type formats that exchange with - say -, users of Reference Manual type formats via the CCF. There is also some discrepancy in the respective definitions of bibliographic levels which may result in some (perhaps not very essential) loss of information for users of MARC type local formats. On the whole, wherever the CCF states "in accordance with the practice of the agency preparing the record" problems of lack of compatibility may arise.

The Future of the Reference Manual

Although the Reference Manual may not be actively maintained by Unesco in the future, there are a number of reasons why its continued use by actual and potential users remains to be a valid practical proposition.

First, there can be no doubt that the Reference Manual is a very adequate source for developing local input formats. One of the reasons for this is that it contains detailed rules for bibliographic description. The absence of cataloguing rules is rather an advantage because it provides flexibility without necessarily hindering compatibility at the exchange level. Since individual data elements are clearly delimited in the format, most automated information systems should be able to generate headings and create access points automatically by program without difficulty. In short, the Reference Manual contains precise guidelines for bibliographic description and at the same time allows freedom of cataloguing, the latter normally without hindering exchange compatibility.

The Reference Manual is also a fully adequate exchange format, in the first place for exchanges among its own users. Since it is compatible with the CCF, Reference Manual users should also be able to convert their internal formats into CCF exchange format. Any limitations here, especially in terms of limited compatibility with e.g. MARC type formats is due to the existing divergencies between the original formats and cataloguing rules rather than to the Reference Manual or CCF as exchange formats. For as long as ISO 2709 remains the international standard carrier format for bibliographic exchanges, Reference Manual users will have the possibility of exchanging in either of the three more universal exchange formats : Reference Manual, UNIMARC or CCF, although it should be borne in mind that the mentioned divergence in cataloguing rules may mean some loss of information for some of the exchange partners.

It may be reiterated that the Reference Manual could be updated to take more advantage of the new fourth element in the ISO 2709 directory to bring its tagging structure and linking facilities more in line with those of the CCF. Although perfectly possible it remains to be seen whether this is also desirable. It seems wise to wait for some feedback on actual implementation of the CCF linking techniques before adopting these. Contrary to the suggestion at one time by the editors of the second edition, a possible change to a multilevel tagging structure seems hardly worthwhile unless there is a manifest demand for this by a considerable number of users.

It may in any case be concluded that adoption of the Reference Manual can still be a realistic and rational choice on a par with the other more generally applicable exchange formats, i.e. UNIMARC and CCF. This will remain to be the case for as long as there are users with local formats geared towards either of these three exchange formats, and for as long as universal use of the CCF will be hampered by persisting local cataloguing differences.

To end on a practical recommendation, the format that comes closest to support specific local needs should be chosen as a source for developing or amending a local format, or as an exchange format, or for both purposes. Provided the local format is compatible with at least one of the three more general exchange formats, either or all of the three can be generated automatically to serve as an exchange format. While format(s) to choose for exchange purposes should depend on the exchange partners. However, it should be kept in mind that, no matter which format is chosen, exchanges between MARC oriented and Reference Manual oriented partners will normally be subject to some loss of (not necessarily essential) bibliographic information due to inherent discrepancies between the local description and cataloguing rules.

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2) UNESCO/UNISIST: Intergovernmental Conference for the Establishment of a World Science Information System. UNESCO, Paris, 4-8 October 1971. Final Report. Paris; Unesco, December 1971, 60p. (SC/MD/25).

3) ISO 2709-1981: Documentation-Format for bibliographic information interchange on magnetic tape. Geneva; International Organization for Standardization, 1981, 4p.

4) For the purpose of this article, cataloguing rules are understood as relating to the entire bibliographic record, i.e. to the description of the item as well as to the choice and form of headings (entry points) for the record, while rules for bibliographic description are only concerned with the description of the item.

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A DECISION THEORY APPROACH TO STANDING ORDER PROCUREMENT OF NASA REPORTS

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Explains various package deal procurement methods including standing order method for library documents and enumerates different standing order services of NTIS for technical reports. Describes the NASA information system. Discusses and analyses the economy of NASA FS service by applying decision theory approach and considering the various costs as well as saving aspects/advantages. Finally, throws open the non-economic factors to be considered in evaluating such a service. Concludes by suggesting ways of making NASA FS service more beneficial to the library of ISRO Satellite Centre (ISAC).

INTRODUCTION

Increased prices, inelastic budgets and inflation are resulting in constrained buying power of libraries. Naturally, libraries explore more and more of gratis and exchange modes of acquisition, especially for unconventional grey literature. However, when inevitably they have to resort to purchasing, reading materials are bought directly or through vendors/agents either on credit basis or on advance payment basis. Some conservative suppliers/agencies have instituted deposit account schemes and coupon systems in place of the advance payment system with a favourable edge to the seller. Irrespective of the size of a library, more desirable and possibly least exploited methods of procurement, which can considerably enhance the utility of limited monetary resources, are standing/bulk orders, package deals, combinations, membership orders, orders on domestic rate suppliers, etc.

It is a common practice in many libraries to place standing orders for advances, annual reviews and other serial titles, including directories and handbooks, to avoid routine ordering work and to make marginal savings. However, certain package deal offers, such as those offered by professional bodies (e.g. IEEE and AIAA) and membership offers (individual, student, associate, institutional membership, e.g. ACM, ISI, BSI, etc.), provide considerable saving in price, procurement time and office work. Combination subscriptions, such as those for SIAM journals, also result in considerable. saving. It is not difficult for a library to evaluate such package/bulk/standing/membership/combination offers. Apart from monetary considerations of reduced price, the offers extend free postage, handling and quick supply on credit basis. At times, additional copies are made available free or at reduced rate and some documents are available only to members or package deal customers, that too in special 'library edition'. The purpose of this paper is to evaluate one of the standing orders of ISAC Library, namely, NASA FS service offered by NTIS.

TECHNICAL REPORTS

NTIS, the largest grey literature handling agency, offers a series of standing orders which include JPRS, FBIS, CIA monographs, NASA-FS and SRIM (which has the additional advantage of saving due to supply in microform). The economies in procurement of technical reports have been dealt with elsewhere while highlighting problems and choices in procurement[1]. Apart from contacting the appropriate source, opting for a suitable standing order enchances the system efficiency. However, changed conditions have to be noted and a trial order needs to be placed, as agents are not much up-to-date and informed and NTIS does not entertain direct enquiries from Indian libraries.

NASA reports are naturally the life blood for a space science and satellite technology library. The relative importance of NASA reports is evident from the results of a recent use study of paper copy reports of ISAC library based on a 20% systematic random sample[2]. Though the overall usage of reports is less, NASA reports, which formed about 27% of sample, were used to the extent of 55% of total use of the entire sample. In other words, NASA reports were the maximum sought after reports in the library. As such, NASA FS standing order service has been availed of by the library since 1982. As NTIS has doubled the price of the service since 1983, it has become necessary to evaluate this trial standing order service.

NASA INFORMATION SYSTEM

It may not be out of context to mention here a few words about the NASA information facility[3] itself. The STIO of NASA collects nearly one lakh documents per year from government organizations, universities, research laboratories, corporations and commercial publishers in USA and from more than 200 foreign countries. The actual acquiring and processing is done by STIF, a contractor - operated NASA installation, TIS of AIAA and ESA, which has exchange agreement with STIO.

NASA keeps most of its collection in microform and bibliographic data in machinable form. It does not supply its documents directly to users abroad. We have to buy them through NTIS or SOD (USGPO). The results of NASA sponsored research are recorded in approximately 10,000 technical reports each year. These reports are obtainable through NTIS[4]. As we understand from one of the Indian agents of NTIS, 3500-4500 NASA reports are input into the NTIS system per year. Thus, NTIS lacks more than 50% of current NASA reports.

STAR, a semi-monthly announcement bulletin of NASA, covers about 25,000 citations to unclassified reports, patents, translations and standards per year. LSTAR is a quarterly bulletin of NASA for unclassified but limited distribution and security classified reports acquired by STIF. It covers less than a thousand to a few thousand citations in an year, which are normally not reannounced in STAR when limitations are removed and 90% of these originate from DOD and the remaining ones are NASA inhouse and contractor reports.

All the reports listed in STAR are not available to public. STAR uses # symbol to indicate that a document is available only in microfiche, * to indicate that the report has originated within NASA or one of its prime contractors and + to indicate unusual problems of reproducibility and the documents being available only in paper copies.

NASA – FS STANDING ORDER SERVICE

The main feature of NASA-FS service of NTIS is that selected unclassified (probably more popular) reports of NASA sponsored research in some selected series in original printed form are regularly (once in a month) mailed from NASA to the customer through NTIS at a flat rate per report, irrespective of its size. NASA-FS service includes supply of reports in popular NASA series, such as CP, CR, RP, SP, TM, TP and a few others. Though it is claimed that the service covers reports in TN and TT series also, we have not received these during the last two years.

The nature of different series of NASA reports covered in the service is worth taking note of. CPs are compilations of scientific and technical papers or transcripts arising from conferences, workshops, symposia, seminars and other professional meetings that NASA elects to publish. CRs contain results of work completed under NASA contracts or grants. The service covers CRs numbered below 50,000 which are printed and considered substantively important. RPs include technical handbooks and manuals, critical tables, monographs and scientific and technical textbooks. SPs include scientific summaries of mission results, scientific photography, atlases and histories and chronologies. In particular, new information resulting from space exploration and significant advances in space science and technology (below 3,000 numbers), handbooks, charts and data compilations on various aspects of science and technology (numbered 3,000s), histories and chronologies (numbered 4,000s), management and evaluation standards providing significant advances for decision-makers in system and program management, design, development, manufacture and evaluation (numbered 6,000s) and such of the SP reports printed by SOD (USGPO) are also covered under SP series. TMs are inhouse reports with classified, preliminary or unconfirmed research results and the service obviously covers such reports which are unclassified and unlimited (numbered above 50,000). The technical publications under TP and a few other series are also included in the service. TNs presented high quality complete technical results but less broad in scope than TRs and TTs, which provide English translations of foreign documents with broad significance for NASA's programs (numbered below 8,000), are supposed to have been covered in this service. One important point to be noted here is that all the reports brought out in these series as per the scope mentioned are not supplied under NASA-FS service and the criteria for inclusion or exclusion of a report are not clear.

In other words, the following series are specifically excluded from NASA-FS service. (i) CRs above 50,000 which contain preliminary, unconfirmed or proprietary information and hence have limits on their distribution, (ii) SPs which fall under technology utilization series (numbered 5,000s) and spacecraft design criteria in four areas of technology – environment, structures, guidance and control and chemical propulsion (numbered 8,000s), (iii) TMs below 50,000 which are not printed but are available only in microfiche and duplicated form, (iv) TRs which are unclassified final reports that provide comprehensive coverage of NASA research project or other information of current and lasting importance to aeronautics or space science, (v) TTs which may have narrower interest and distribution limitations (numbered 8,000s) and are not printed, but are available in microfiche or duplicated form, and (vi) NASA patents.

The foregoing discussion of the scope of NASA-FS service gives an idea of the types of NASA reports expected in the standing order service. Looking at the quantum of reports and the financial implications of the service, we see that NASA-FS service carried 425 reports in 1981 and about 371 (estimated) in 1982. The number during 1983 and 1984 (estimated) was 382 and 417 respectively. This service has undergone several changes during last few years and as a result the total number of reports is believed to have come down drastically. NTIS, as a commercial organization, might be discouraging this service, as is evident from the fact that the flat rate of $ 10 per report in 1982 has been doubled since 1 January 1983 and it is this aspect that has prompted this analysis.

On the other hand, SRIM service, which is also a standing order service, is for microfiche copies of reports falling under specified subject groups or those originating from a specified organization (e.g. NASA) supplied at a flat rate of $ 2 in 1983 and $ 2.20 in 1984 per report. But reports supplied in SRIM service are not necessarily current reports. There is a considerable time lag in the supply of NASA reports under SRIM service compared to NASA-FS service. About 4,000 NASA reports per year are expected under SRIM if all NASA reports are specified. Most of the reports available under NASA-FS service are not made available in SRIM service. For example, in the month of May 1982, only one report became common between NASA-FS service and SRIM service for NASA reports.

ECONOMIC ASPECTS OF THE DECISION

In order to facilitate taking the decision whether to continue to NASA-FS standing order service or not we examined the actual reports supplied for about six months during 1983 in different series. Our assessment has shown that about 59% of reports are fairly relevant to ISAC library and the library would have otherwise also acquired in case announcement lists were scanned regularly. The breakup of this relevance among different series, is presented in Table 1, which also incorporates the percentage of supply in different series and average size/ price (with code) for different series for buying the reports individually. Hence, this model has been based on estimated percentage of relevant reports and estimated average price for each series.

It is seen from Table 1 that it would have cost US $ 7,122 to buy individually the 218

Table 1

(Decision Model 1)

Probable cost of relevant NASA reports based on probability of occurrence of a series and its average cost

Series	Supplies in 1983		% of relevant reports	Average size/Price		Cost of relevant reports in $, i.e. (2) x (4) x (6) / 100
	No.	%		Code	1983 price in $	
1	2	3	4	5	6	7
CP	36	9.4	80	A18	62	1786
CR	93	24.3	52	A09	35	1693
RP	17	4.4	83	A06	26	367
SP	10	2.6	83	A09	35	291
TM	79	20.7	62	A07	29	1420
TP	146	38.2	46	A05	23	1545
Others	1	0.3	100	A04	20	20
Total	382	99.9	57	-	-	7122

relevant reports out of a total of 382 reports supplied through NASA-FS standing order service. On the other hand, the standing order (for 1983) has cost US $ 7,640 at the rate of $ 20 per report (for 382 reports). In both cases, the mandatory air freight charges are excluded. Thus, there is a marginal loss of $ 518 ($ 7,640–7,122) towards the remaining 164 less relevant and irrelevant reports. Another dimension of the cost not indicated in this analysis is the cost of processing and storing irrelevant reports. However, if the procedure permits, the library can avoid this cost by not taking irrelevant reports to the stock but to give them away to other libraries for which they are potentially useful, either as gift or at a reduced price, and recover a substantial part of the expenditure on NASA-FS service. Hence, as per Decision Model 1, it is still not clearly beneficial to ISAC library to continue with NASA-FS service unless the cost of less relevant and irrelevant reports is recovered. It is but natural that the savings and advantages of the service would have been enormous had the service continued at the 1982 price of $ 10 or even at a marginal increase in price per report instead of $ 20. While the price of a report for individual purchase has been marginally increased by $ 2 per report, irrespective of size, the price per report in NASA-FS service has been increased by $ 10 per report in 1983.

An alternative decision model is presented in Table 2, which is based on probability of price group of actual supply of reports if the same have to be bought separately. This model emphasizes the price distribution of actual supplies and not the distribution of relevance percentage among reports of different series of the previous model.

If ISAC library has to buy all 1983 NASA reports obtained through NASA-FS service on individual price basis, as per Table 2, it would have cost $ 9,788. Hence, there is a saving of $ 2,148 (i.e. $ 9,788 – 7,640), provided all the 382 reports are relevant and useful. Since only 59% (i.e. 218) of them are found relevant and useful, the proportional cost has to be worked out and examined.

Table 2 shows $ 50 as the median cost of a report and based on this the total cost of 218 relevant reports would have been $10,900, which shows a saving of $ 3,260 (i.e. $3,260–7,640). Another version of Model 2 can also be worked out based on the mode cost of $ 17

Table 2

(Decision Model 2)

Probable cost of relevant NASA reports based on probability of occurrance of a price group of actual supply

1983				Expected cost per report, i.e. (2) x (4)	Total cost of reports in $, i.e. (2) x (3)
		Supplies			
Price code	Price in $	No.	Probability		
1	2	3	4	5	6
A02	14	75	0.196	2.74	1050
A03	17	83	0.217	3.69	1411
A04	20	55	0.144	2.88	1100
A05	23	39	0.102	2.35	897
A06	26	28	0.072	1.87	728
A07	29	11	0.029	0.84	319
A08	32	18	0.047	1.50	576
A09	35	12	0.031	1.09	420
A10	38	10	0.026	0.99	380
A11	41	7	0.018	0.74	287
A12	44	4	0.010	0.44	176
A13	47	7	0.018	0.85	329
A14	50	2	0.010	0.50	200
A15	43	2	0.005	0.27	106
A16	56	5	0.013	0.73	280
A17	59	6	0.016	0.94	354
A18	62	2	0.005	0.31	124
A19	64	3	0.008	0.52	195
A20	68	3	0.008	0.54	204
A21	71	1	0.003	0.21	71
A22	74	0	0.000	0.00	00
A23	77	2	0.005	0.39	154
A24	00	0	0.000	0.00	00
A25	83	1	0.003	0.25	83
A26	86	4	0.010	0.86	344
Total	-	382	0.996	25.50	9788

per report. According to this, the relevant reports would cost only $3,706, showing a loss of $ 3,934 (i.e. $ 7,640–3,706) towards less relevant and irrelevant reports.

Table 2 also reveals the weighted average price of a report as $ 25.5. A recent study[5] has shown that the average report from NTIS through Indian agents has cost about $23 (excluding mandatory air freight charges). Thus, it establishes, incidentally, a fact which otherwise would have led to suspicion that the supplier might push less costly reports in a standing order deal like NASA-FS service.

The third version of the model based on the (weighted average/mean shows that $5,559 would have been sufficient to buy all relevant reports. This leads to a loss of $2,081 (i.e. $ 7,640–5,559) due to 164 less relevant and irrelevant reports. The third version of the model based on mean is statistically more dependable than versions 1 and 2.

A consolidation of the results of both the model is presented in Table 3. Ignoring version 2 and 3 of Model 2, the choice is between Model 1 and version 3 of Model 2. Since Model 1 is based on probability of a series and the average cost of a report in a given series, whereas Model 2 is based on probability of individual purchase cost of a given report, the first model is aggressive and the second one is conservative.

By either model, the NASA-FS service is not cost efficient or economically justifiable and the library incurs a loss of $ 518/2081 towards less relevant and irrelevant reports. We may note here that the errors in the estimates, including the estimate of relevant reports, are not taken into account in the analysis and a combination of Decision Models 1 and 2 could not be developed, as data were not available.

Another question is: At what percentage of relevance (i.e. relevant reports supplied) is the NASA-FS standing order service econonomically justifiable as per Model 2 and 'breaks even' the cost of individual purchase of relevant reports? To anser this question we have to find out what percentage of $ 9,788 is $ 7,640 and the answer is 78%.

NON-ECONOMIC ASPECTS OF THE DECISION

The economic considerations have revealed that NASA-FS service at the revised price of $ 20 per report is not justifiable, unless the percentage of relevant reports is not less than 78 or the less relevant and irrelevant reports can be resold to recover a part of the expenditure. However, the analysis, has not considered the cost of selecting, order processing and reminding in the case of individual purchase of relevant reports. Finally, the non-economic considerations also have to be examined before accepting the above decision.

Table 3: Cost of less relevant and irrelevant reports

	Model 1 (based on probability of a series and its average cost)	Model 2 (based on probability of price of a report)		
		Version 1 (Median)	Version 2 (Mode)	Version 3 (Mean)
Cost of relevant reports by direct purchase ($)	7122	10900	3706	5559
Cost of standing order ($)	7640	7640	7640	7640
Cost of less relevant and irrelevant reports ($)	- 518	+3260	- 3934	- 2081

Firstly, NASA-FS service brings reports within a month or two of their production directly from NASA unlike scanning announcement bulletins of NASA and NTIS, which take not less than six months to come. When individual orders are placed, as per a recent case study[6], just 60% of reports are supplied within six months from the date of placing order. Thus, a total delay of supply of the same NASA reports to users could be 1-2 years. On the other hand, NASA-FS service, partially fulfilling the requirement of a current awareness service, brings the reports much earlier than any announcement bulletin.

Secondly, all NASA reports under NASA-FS service are original, neatly printed, attractive, legible and readable. Against this, most of the reports supplied by NTIS against individual orders are poor quality reproductions on one side of loose sheets from microfiche originals. As such, diagrams and photographs are not legible. Though NTIS claims that one in every five reports supplied is normally original printed report and "Approximately 15% of NASA - generated scientific and technical information is printed...[7]. The experience at ISAC library is that printed reports are supplied against stray orders only rarely.

Lastly, the one-sided loose copies of reports supplied by NTIS against individual orders invariably need immediate binding before they are released for use, involving additional delay and cost.

CONCLUSION

Before taking a final decision, the results and observations involving all the above economic and non-economic considerations were presented before a user representative committee. The committee decided not to cancel the NASA-FS service at least for another six months (i.e. up to April 1985) due to the special occasion of the 25th anniversary of NASA, which is expected to bring several useful and interesting conference publications. Many users have felt that some of the reports under this service are invaluable sources of information. It has also been decided to review and assess the matter after the above event before a final decision, is taken.

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Abbreviations and acronomys used

ACM	Association for Computing Machinery (USA)
AIAA	American Institute of Aeronautics & Astronautics
BSI	British Standards Institution
CIA	Central Intelligence Agency (USA)
CP	Conference Publications
CR	Contractor Reports
DOD	Department of Defense (USA)
ESA	European Space Agency
FBIS	Foreign Broadcast Information Service
FS	Formal Service
IEEE	Institute for Electrical & Electronics Engineers
ISAC	ISRO Satellite Centre
ISI	Indian Standards Institute
ISRO	Indian Space Research Organisation

JPRS	Joint Publications Research Service (USA)
LSTAR	Limited Scientific and Technical Aerospace Reports
NASA	National Aeronautics and Space Administration (USA)
NTIS	National Technical Information Service (USA)
RP	Reference Publications
SIAM	Society for Industrial & Applied Mathematics (USA)
SOD	Superintendent of Documents (USAPO)
SP	Special Publications
SRIM	Selected Research in Microfiche
STAR	Scientific & Technical Aerospace Reports
STIF	Scientific & Technical Information Facility (USA)
STIO	Scientific & Technical Information Office (USA)
TIS	Technical Information Service (USA)
TM	Technical Memorandums
TN	Technical Notes
TP	Technical Publications
TR	Technical Reports
TT	Technical Translations
USGPO	United States Government Printing Office

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A PACKAGE FOR PROCESSING REFEREE'S ROSTER DATA FOR IJPAP USING A MINICOMPUTER HP-1000 SYSTEM

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Various aspects regarding storage, retrieval and updating of the referees, data for the journal Indian Journal of Pure & Applied Physics (IJPAP), has been studied by means of a minicomputer HP-1000. An application package of programs in the higher level programming language FORTRAN IV has been developed for bringing out the listings of profile of referees (Source Index) using the Main File, and for the area of specialization (Keyword Index) and for the physics and astrophysics classification scheme codes (PACS Index) using inverted files.

INTRODUCTION

Some work regarding the applications of computers in various information and retrieval projects undertaken at PID has been carried out during the last decade, viz., the bringing-out of KWOC indexes for PID journals[1-2] and development of some experimental information retrieval program packages[3-4] in the field of medicinal and aromatic plants. Of late, the work regarding these projects was carried out using mainly a HP-1000 system. The present study reported here has been undertaken to process the referees' roster data, on a HP-1000 system.

IJPAP is a monthly journal brought out by the Publications & Information Directorate along with 11 other research journals. The quality of a scientific journal depends to a large extent on the rigorous standards of refereeing adopted by its editorial office. This naturally requires an efficient method of storage and retrieval of this information for quick retrieval and updating. The preparation of referees' roster manually becomes cumbersome, as the data has to be updated periodically by adding the names of new workers coming up on the research scene and the panels have to be kept up-to-date in respect of the latest areas of specialization of the experts. In the following, a description of the package of programs developed to handle these aspects for the referees' roster data is given.

COMPUTER SYSTEM DESCRIPTION

HP-1000 minicomputer with 32 K core memory, two magnetic tape drives (800 bpi), one floppy drive (0.5 MB), one card reader and a 300 lpm dot-matrix line printer were the peripherals used. The programs were developed in the higher level language FORTRAN IV under RTE-M(III) operating system.

SYSTEM DESIGN

Main file description

Data on the referees' roster for IJPAP contains the expert's name, institution address, codes for the areas of specialization and a set of descriptors indicating the subject. Data format design for the main file was finalized taking into account the possible variations in field lengths and the repetition of fields. Each record of the referee's data was allotted up to four 80 - byte records (i.e. 320 bytes). The first record contains the referee's name in columns 1-50, and up to five 6-digited codes in columns 51-80. The second record was fixed for address, and the third and fourth, if required, for the relevant keywords to describe the area of specialization. The keywords were delimited by a slash (/) and the end of keywords indicated by double slashes (//). A maximum length of upto 40 characters for the keyword and author fields was fixed. This data was prepared on a magnetic tape as 80 - byte records using the key-to-tape machine EC-9002.

Main file creation

A program validates the data of the main file for the author field length, keywords field length and for keyword separation/termination. Another program creates a 320-byte record for each referee from the 80-byte records of the input tape. The 320-byte records thus generated are sorted on columns 1-40 (name of the referee) and the sorted 320-byte records are again split into 80-byte records providing the Main File containing the referees' roster data. The idea maintaining the Main File as 80-byte records is to facilitate the updating of the Main File as described later. A sample of 80-byte Main File is shown in Fig. 1.

Inverted files

An inverted file (File 1 A) of 160-byte record-length was created from the Main File with the following format:

Bytes	Description
1-40	Keyword
51-80	Referee's Name
81-160	Address

Another inverted file (File 2A) was created from the Main File with the same format reserving col 1-40 for code. The two files were sorted, on keyword/code as the first sorting-field, and the referee's name as the second sorting-field, yielding respectively File 1 and File 2. A sample of listing from File 1 and File 2 is shown in Fig. 2.

LISTINGS FROM MAIN FILE/INVERTED FILES

A program brings out listings in appropriate formats from the Main File/inverted files. Source Index (Fig. 3) was brought out using the Main File and printing all the elements contained in the referees' roster data. The referees' names are arranged alphabetically in the Source Index. Keyword Index (Fig. 4) was printed from the inverted file (File 1) and PACS Index (Fig. 5) from the inverted file (File 2). Keyword Index and PACS Index provide information regarding different experts engaged in a particular specialization. For printing the fields in more than one line, the text was printed in a line upto certain special characters, e.g. comma (,), blank ( ), hyphen (-), right parenthesis ( )), slash (/) and point (.). Breaking the words at the line-endings in this way improves readability of the printouts.

All these three printouts are found to be very useful by the editorial department.

UPDATING

The updating feature in this type of package is an important aspect for its efficient implementation. In order to solve this problem in a simple way, the HP-1000 editor itself was used for this purpose. But the editing software can handle record lengths up to 128 bytes. Due to that limitation, it was decided to keep the Main File in 80-byte physical records. Using this software, the records pertaining to a new referee on the panel can be added at appropriate place, the records pertaining to a referee be deleted if desired and the changes regarding address and specialization be made if necessary. Thus the Main File can be updated as and when required.

DISCUSSION

Manual operation of the referees' data provides only one key (entry point), i.e. the name of the expert. Sorted arrangements for the subject of specialization and the codes for different areas of work are very difficult to be made in this case. Periodic data updating and bringing out the various index listings becomes cumbersome. All these aspects have been tackled in the described system. Also more copies for consultation in the editorial office can be obtained on a line printer. These features make it worthwhile to handle the referees' roster data using minicomputers.

System flow chart for the described package is given in Fig 6.

```
REFEREE A                                         33.00 33.20K78.30 78.40
ASSOC PROF, MOLEC PHYS DIV, SAHA INST OF NUCL PHYS, CALCUTTA 700009
MOLECULAR SPECTRA/VISIBLE SPECTRA/INFRARED SPECTRA/RAMAN SPECTRA/ULTRAVIOLET SPE
CTRA//
REFEREE B                                         05.00 05.20 05.50 02.50
FELLOW, THEOR PHYS GROUP, TATA INST OF FUNFAMENT RES, BOMBAY 400005
STASTICAL PHYSICS/STATISTICAL MECHANICS/LATTICE THEORY/ISING/PROBABILITY THEORY/
/
REFEREE C                                         81.00 81.30 81.40 81.40N81.40L
SCIENTIST EI, CREEP DIV, NATIONAL METAL LABORATORY, JAMSHEDPUR 831007
MATERIAL SCIENCE/PHASE TRANSFORMATION/TREATMENT OF MATERIALS/FATIGUE/DEFORMATION
 AND CREEP/PRECIPITATION/STRENGTHENING//
```

Fig. 1. Sample records of Main File

```
CRYSTAL MORPHOLOGY                      REFEREE A
READER, DEPARTMENT OF PHYSICS, UNIVERSITY OF JAMMU, JAMMU 180001
CRYSTAL STRUCTURE                      REFEREE B
LECTURER, PHYSICS DEPARTMENT, MADURAI KAMARAJ UNIVERSITY, MADURAI 625021
CRYSTAL STRUCTURE                       REFEREE C
READER,, CRYST AND MOLE BIO DIV, SAHA INST OF NUCL PHYS, CALCUTTA 700064

30.00                                   REFEREE A
PHYSICS DEPARTMENT, BANARAS HINDU UNIVERSITY, VARANASI 221005
31.00                                  REFEREE B
READER, DIV OF APPL SCI, ANNA UNIVERSITY, MADRAS INST OF TECH, MADRAS 600044
31.00                                   REFEREE C
DEPARTMENT OF PHYSICS, KARNATAK UNIVERSITY, DHARWAD 580003
```

Fig. 2. Sample records of inverted files (File 1 and 2).

```
REFEREE A
   ASSIST PROF, PHYS DEPT, INDIAN INST OF TECH, KHARAGPUR
   721302

    CONDENSED MATTER/CRYSTALLOGRAPHY/DEFECTS IN CRYSTALS/EARTH PHYSICS/
    DIFFRACTION/X-RAY CRYSTALLOGRAPHY//

    60.00    61.00    61.70    91.60    61.14D

**************************************************************************

REFEREE B
   PHYS DEPT, BURDWAN UNIV, BURDWAN 713104

    OPTICS/LASING PROCESSES/LASER SYSTEMS/NONLINEAR OPTICS/
    OPTICAL PROPERTIES OF SOLIDS/OPTICAL DEVICES/NONLINEAR CRYSTALS/
    OPTICAL SPECTRA//

    42.00    42.55    42.65    78.00    42.80
```

Fig.3. Sample of Source Index

```
RADIOACTIVITY
   REFEREE A
   PHYS DEPT, PANJAB UNIV, CHANDIGARH 160014

RADIOMETERS
   REFEREE B
   INFRARED SECTION, NATIONAL PHYSICAL LABORATORY, HILLSIDE
   ROAD NEW DELHI 110012

RAMAN AND RAYLEIGH SPECTRA
   REFEREE C
   READER, KURUKSHETRA UNIV, KURUKSHETRA 132119

RAMAN SPECTRA
   REFEREE D
   SCIENTIST, NUCL PHYS DIV,, BHABHA ATOM RES CENTRE, BOMBAY
   400085
```

Fig.4. Sample of Keyword Index

```
             CLASSIFICATION INDEX

78,70E
   REFEREE A
   READER, SCHOOL OF STUDIES IN PHYSICS, VIKRAM UNIVERSITY,
   UJJAIN 456010

78.00
   REFEREE C
   PHYS DEPT, BURDWAN UNIV, BURDWAN 713104

78.00
   REFEREE D
   INFRARED SECTION, NATIONAL PHYSICAL LABORATORY, HILLSIDE
   ROAD NEW DELHI 110012
```

Fig.5. Sample of PACS Index

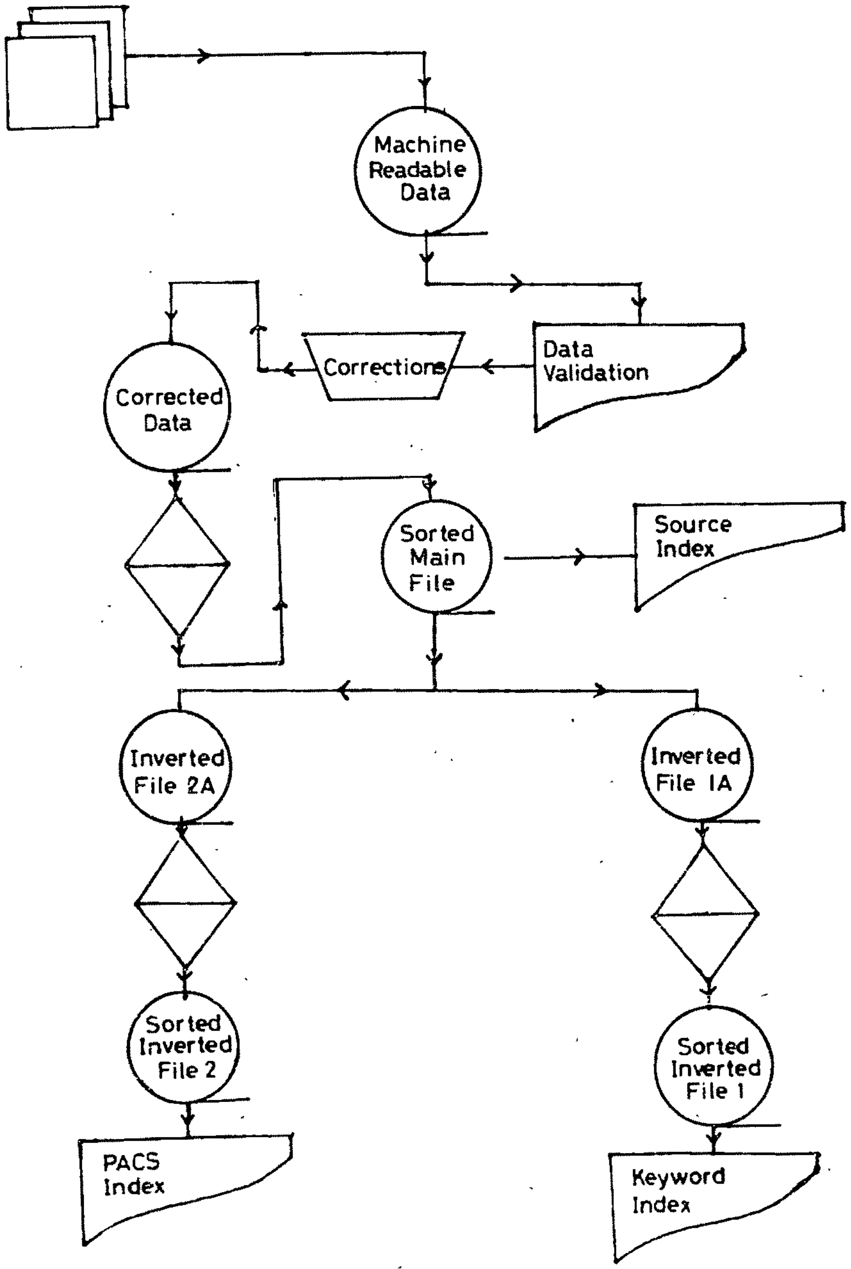

Fig.6. System Flow Chart

CONCLUSION

Compilation of referees' roster for a research journal is an important link for information dissemination. This job can be done efficiently by the usage of a minicomputer. The system will be found more useful when it is extended to a lot of other journals which is to be taken up shortly.

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SEARCHING METADEX ONLINE

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An online information retrieval system with wide range of interrogation facilities has been developed to operate METADEX. Attempts to describe the searching pattern with respect to the characteristics of the indexing language and the capabilities of the search system. The limitations imposed by the controlled vocabulary based retrieval are overcome by an augmented free text retrieval incorporated in the search system. The system supports trial-and-error based search method to enhance the retrieval through which tentative search strategies can be formulated and inspected for their adaptability.

INTRODUCTION

In the early seventies only a few large scale commercial online systems came into operation and within the decade online IRS achieved astounding growth in North America and Europe. In India also much enthusiasm is being shown towards this area. Experimental studies were undertaken at Tata Institute of Fundamental Research[1] and National Aeronautical Laboratory[2], to access ESA/RECON through communication networks. Bharat Heavy Electricals Limited has gone a step ahead to avail DIALOG through International telex network using telex machine as remote terminal[3]. Now commercial software packages for online information retrieval, for example, ISIS and MINISIS are also available in the country and are under study for implementation. Computer programs for in-house SDI services employing offline searching have been developed at various centres. However, efforts are being made to design and develop online IRS at Indian National Scientific Documentation Centre and Indian Institute of Science.

The need for developing an indigenous search system was felt to meet the information requirements of Indian Iron and Steel industry. Computer programs for off-line searching for SDI services developed in the beginning were found to be extremely CPU bound and exorbitantly expensive to operate METADEX for large number of user interest profiles. In off-line processing, the entire database is to be processed as many times as many interest profiles. Moreover, the very nature of search strategies that usually involves heuristic approach is forbidden in off-line processing and therefore refining of search queries turns to be cumbersome and tedious. Iron and Steel Online (ISOLINE) search system has emerged to outweigh the problems encountered in off-line processing and is perhaps the first of its kind in the country to undergo successful operation. This paper attempts to highlight the search system in a nutshell and describes the search methodology. Earlier studies in the derivation of search strategies discuss the generalized search methodologies [4-9]. The searching pattern described here compromises with the controlled vocabulary based query language of the search system and the indexing language of METADEX.

ISOLINE – SOFTWARE

The structure of source database–METADEX–is described in detail in METADEX User (Manual[10]. The sequentially ordered document records of METADEX have been processed to generate document base and inverted files and overflow files for elements deemed to be important to our applications. The physical storage structures of the inverted files use overflow files with a view to easing the task of updating and also to achieve economy of storage. The total system has been decomposed into several modules and modules are further segmented into submodules. The users' interface module has been in-built with extensive diagnostic error analysis that enhances man-machine dialogue. In addition to interactive searching, it supports fast batch processing for SDI searches. In SDI searches, the end user is virtually replaced by a file consisting of search queries in query language of the system that would otherwise have been emanated from the end user. The system supports variety of functions of a typical online system such as assisting user for searching, scanning the lexicon for selecting terms, generating search sets, comparing and contrasting the search sets, displaying the resultant retrieved set and printing the search results. These functions are captured by 18 commands of self-expressive nature. The commands can be called by their abbreviated forms too. The commands and their formats are given in Table 1.

The software has been developed in ANSI COBOL 1974 and FORTRAN 77 and is implemented on a SPERRY UNIVAC-1100/60 mainframe. Interface module, the largest of all, takes 48K words. SDI searches in batch mode for 100 user interest profiles takes about 3.5 minutes CPU time for searching alone (excluding off-line printing time). For preserving online environment for one year volume of METADEX comprising about 50,000 documents, total mass storage requirement is about 75 MB. Detailed description of the search system covering functional aspects of the commands and computational aspects of the system are reported elsewhere[11].

Table 1

Commands and functions of the search system

Command **Full form**	 **Abbr. form**	**Function**
HELP	H	Assistance to users
EXPAND	E	Display the term dictionary
SPOOL	SP	Extend the display of term dictionary
EXPAND-SELECT	ES	Generates search set through expand-table
SELECT	S	Generates search set for a given term
COMBINE	C	Integrates the search sets.
SUPER-SELECT	SS	Generates and integrates search sets.
DISPLAY	D	Display the documents of a particular search set.
PRINT	P	Prints out the search result
LIST	L	Prints out the search result in descending chronological order.
SORT	SO	Prints out the search result in preferred language sequence.
RANK	R	Ranks the search output.
FIND	F	Free text retrieval (limited to search sets generated)
QUIT	Q	Scratches the search done
JUMP	J	Transfers the search from one user to another
WAIT	W	Suspend the run
BACK-UP	B	Display the search history
TERMINATE	T	Causes normal termination

PRE-SEARCH PROCEDURES

Search Topic Identification

Generally recommended pre-search interview has been deferred to post-search session with a view to enabling the end users perceiving the conceptual base of computer-assisted search system from the service offered to them. Despite the fact that the users were requested to list out keywords pertaining to their area of interests, keywords given by the users are often found implicit and inadequate. In some cases the keywords crossed the boundary limit of the topic otherwise depicted. Swanson[12] opined that a request with imperfect description appears to be amenable in most cases. Therefore interpretation of data supplied by the users to form a search topic rest with the search analysts. Keywords given by users are studied with the aid of dictionaries and thesaurus in the field of metallurgy to arrive at what the users intended to request for. Correlating those sketchy keywords with the subject areas specified and projects in which they are involved providing some idea for identifying the topic. However, there are incidences where pre-search interviews becomes indispensable.

Search Topic Analysis

In this process, the topic is being realized in terms of its conceptual components, in which each component is transmuted into search arguments of the query language of the system.

It is always endeavoured to derive a faceted structure and identify the primary and secondary facets in the order of increasing complexity wherever applicable. Conceptual components ordered in a strict faceted structure simplify the task of integrating the sparsed components.

Concept Mapping

Concept mapping involves elaboration and remification of the conceptual components by means of incorporating generically and semantically related concepts and to match with the degree of specificity as well as exhaustivity implied by the user and translating the concepts into search terms in conformity with the syntactic structure prescribed by the indexing language of METADEX as described in the following sections. These steps can be categorized into:moving from genus entity to species entity, incorporating quasi-synonyms, selection of standard terms, deriving compound search terms, moving from species entity to genus entity and control of word forms.

(i) Moving from Genus to Species Concepts

As the indexing language of METADEX prescribes high degree of specificity and low level of exhaustivity with respect to generic concepts, it forbids documents being indexed with the immediate broader concepts. For instance, documents dealing with LD CONVERTERS, BASIC CONVERTERS are indexed by the particular process, but never indexed by STEEL MAKING. Consequently those documents become fall-out if search is undertaken only with the term STEEL MAKING. It is, therefore, essential to incorporate all narrower terms with the help of ASM Thesaurus on Metallurgical Terms to undertake searches on broader concepts in conjunction with the broader terms since documents dealing with broader concepts are indexed by broader terms. Universal Decimal Classification-full edition on metallurgy is also of some use in this regard.

(ii) Inclusion of Quasi-synonyms

No synonymous terms need to be incorporated as the same is controlled by standard terms, whereas consideration of quasi-synonyms rely mostly on the treatment of the same in the database. Quasi-synonyms usually cover penumbral region of the core subject. For example, in METADEX, the keywords PROCESS CONTROL, MICROPROCESSORS, and INSTRUMENTATION are treated as quasi-synonyms. A document index under INSTRUMENTATION may be very much related to PROCESS CONTROL. The task of identifying the quasi-synonymous relationship is rather problematic and only experienced search analysts could outweigh such cases. Besides this factor, inclusion of quasi-synonyms can be determined based on the number of hits in the resultant retrieved set and the degree of specificity/exhaustivity indicated by the users.

(iii) Selection of Standard Terms

Considering the fact that the retrieval is effective only through the controlled vocabulary, a variety of terms gathered are finally filtered through the controlled vocabulary tools. In addition to the thesaurus. Annual index of ***Metals Abstracts*** is consulted for the terms not incorporated in the thesaurus. *Online Terms Dictionary,* the last but not the least, is scanned during the search session for the terms having qualifier status. The thesaurus specifies only the standard form of terms – may be or may not be multiworded but stands for single concept – whereas METADEX adopts compound concepts. Therefore, a term, though a recommended version ***as per*** the thesaurus, is likely to yield mismatch or partial match. It is evident from the term-table (Exhibit 1) that the term CORROSION, if specified alone, causes loss of more than 368 documents. Therefore all the three tools altogether control synonyms, variant in spelling, singular/plural forms and syntactic structure.

(iv) Predefined Interrelated Concepts

The indexing language of the host database advocates an indexing policy that derives in depth and highly specific keywords by adding an interrelated concept as a qualifier where coordination of two interrelated concepts are predefined. It may also be stated that the principle underlying the treatment of a qualifier does not conform to the generally accepted indexing principle. A fragment of the term dictionary (Exhibit 1) shows the indexing pattern of METADEX. Predefined interrelated concepts eliminate the need of post-coordination of these concepts during the logical combination of sparsed search sets. In such cases, search could be made directly with such compound terms. For instance, a query on MICROSTRUCTURAL EFFECTS IN CORROSION FATIGUE could be simplified by a single search term, CORROSION FATIGUE, MICROSTRUCTURAL EFFECTS (see E12 of Exhibit-1), instead of searching with CORROSION and MICROSTRUCTURAL EFFECTS and FATIGUE and then combining them.

(v) Control of World Forms

Control of world form need not essentially be control of word ending, singular/plural forms. Virtually it promotes searches on a stem of a world to extend the search to all search terms that have identical root. For instance, searches on DEOXIDIZER and also on DEOXIDIZING could be simplified by controlling the word form DEOXIDIZ, by appending the root search indicator '*' to the stem of the word. The extensive use of qualifier in the source database uplifts the adventageous feature of root searching by allowing root search on principal terms. Thus the object, for root searching could be a concept rather than a stem of a word.

(vi) Moving from Species to Genus Concepts

When the topic of the search appears to be too narrow to have any hit due to the complexity of the topic that evolves from two or more concepts of highly specific nature as well as of equal importance, any of the concept indicators, preferably the secondary concepts may be moved up in order to serve the users with a few hits for their feedback. For instance, if a query is on COLD MODELLING OF OXYGEN STEELMAKING which appears seldom in the literature, the term SIMULATION can be considered in the place of COLD MODELLING.

Logical Combination of Search Sets

The search topic is broken down into various components and then the components are expanded. The query language of the system amalgamates search components by Boolean connectors, AND, OR and NOT, to represent a topic. The logical combination of components are nothing but a postcoordination of search terms. Identification of Boolean logical connectors becomes easier for the search elements derived on the basis of faceted structure. In case, no facet structure is conceivable and relationship between the search elements remain sketchy, potentials of interactive searching offers solution through trial-and-error basis. In this process one or more tentative queries are derived and tested and the query of close proximity is selected. Let us consider a topic consisting of three different facets, A, B and C evolved from the search elements as given below:

$$A = a_1, a_2, a_3 = a_1 \text{ OR } a_2 \text{ OR } a_3$$

$$B = b_1, b_2 = b_1 \text{ OR } b_2$$

$$C = c_1 = c_1$$

Maximum eight different expressions can be derived from these sets as listed under:

A AND B AND C
A AND B OR C
A OR B OR C
A OR B AND C
B AND C OR A
C AND A OR B
C OR A AND B
C OR B AND A

However, the searcher can eliminate the formulations of unrealistic nature and the rest of the formulations can be considered for testing during the search session. The search system is also capable of ranking the search results for queries involving primary and secondary importance. It is not uncommon to come across a query in the form "I am interested in FATIGUE IN DUAL PHASE STEELS, but my specific interest is in FATIGUE FAILURES IN DUAL PHASE STEELS". The search steps required to rank the search results in a specific order can be illustrated as follows

```
SELECT     DUAL PHASE STEELS*  (A)
SELECT     FATIGUE*            (B)
SELECT     FATIGUE FAILURE*    (C)
COMBINE    A AND B             (D)
COMBINE    A  AND  C           (E)
COMBINE    D NOT E             (F)
RANK       E, F                (G)
PRINT      G
```

SEARCH SESSION

Use of Online Term Dictionary

The potential of interactive searching do not presuppose the entire pre-search procedures described in the earlier section. However, the more attention is given towards pre-search procedures, the less computer resources it involves. Therefore the determination of the manual involvement in computer resources rest with the searcher. Scanning the online term dictionary through EXPAND or SPOOL command is an alternative approach to select search terms. Exhibit 1 illustrates the use of EXPAND command for the term CORROSION. A shortcoming of the term dictionary is that it does not link the generically and semantically related terms which is often essential to move from generic to specific term and vice versa and therefore use of the thesaurus remains indispensable. In METADEX, many of qualifiers do not receive lead term status. In order to promote access to all terms of qualifying nature, the indexing language of METADEX is restructured and thereby the qualifiers that do not have lead term status are brought forward to lead term status by the search system. With this approach, frequency of keywords per year rises from about 1,90,000 to 2,40,000 facilitating 26% additional entry points. Except the term dictionary, no other tool is of any use for selection of terms of this kind. Another advantage of scanning the term dictionary is that not only it prescribes the syntactic structure of a term but also denotes the presence of the term in the document base and the frequency of occurrences, if present. Frequency of occurrences enables the searcher to perceive the likely outcome of various formulations of a search query and accordingly the search query can be, to some extent, refined at this stage. The utility of the term dictionary is certainly higher than other tools mentioned earlier. On the other hand, scanning of the online term dictionary involves considerable computer cost. Therefore, Term Frequency Record for Metallurgy, the hard copy of the term dictionary has been produced. A sample image of the Term Frequency Record is shown in Exhibit 2. In addition, the term dictionary gives the frequency of occurrences of keywords in the document base, the Term Frequency Record gives total number of occurrences of principal terms.

Set Construction of Search Elements

Despite the fact that the process described in this section appears to be a function of searching, the concept 'searching' in its entirety in the context of online searching tends to mean the cohesive process that includes derivation of search request formulation, interrogating with document base and evaluation of search results. EXPAND-SELECT command generates a set for the search term chosen from the expand-table resulted either by EXPAND or SPOOL command, through the array reference to the expand-table. The most recent expand-table is only effective for the EXPAND-SELECT command. SELECT command, unlike EXPAND-SELECT forms a search set for a given term directly through the inverted files. Since most of the searches are derived from keywords, SELECT command is designed to accept search term of keyword type without any prefixing code. Besides, SELECT command facilitates root searching. Character masking is another extended facility offered by the SELECT command that enables the searcher to mask characters in the search term string, which are not quite certain to the searcher, by a dummy character'?'. For example, the search term AIR POLLUTION would retrieve the item present in either of the form AIR POLLUTION or AIR-POLLUTION, whichever is the standard form. Character masking is especially useful for controlling singular/plural forms. It does not impose any restriction except for the leftmost position. Character masking should not be confused with root searching. Character masking ignores the characters that are masked by the character masking indicator, whereas root searching ignores the entire string of characters followed by the root searching indicator. As far as the right hand truncation is concerned, root searching and character masking are symbiont to each other in the sense that when only a definite number of characters are to be skipped, character masking can be used, otherwise root searching can be used. For instance COMPUT??? would retrieve only COMPUTERS, whereas COMPUT* would retrieve COMPUTATION, COMPUTERS, COMPUTER AIDED DESIGN, COMPUTER CONTROL, COMPUTER PROGRAMS, COMPUTER SIMULATION etc. Searchers are often tempted to truncate a term just to ignore the unwitty trailing characters of the term that would otherwise need consultation of vocabulary control tools, which may perhaps end up with retrieval of unwanted items. For example, if a user truncates the word DEOXIDIZING as DEOXIDIZ* that will retrieve DEOXIDIZERS too, which may not be of interest to him. With reference to the EXPAND-SELECT and SELECT commands, the system designates an alpha-code and displays the same along with the number of postings in the document base.

Search Limitation for Non-standard Terms

In general, updating of controlled vocabulary tools for incorporating new technical jargons that have started appearing in the literature involves considerable time gap. COLD MODELLING and COKE RATE are typical examples with respect to METADEX. Furthermore controlled vocabulary based retrieval does not support depth queries where specificity is increased by adjectives, for instance, LARGE BLAST FURNACES. Though such cases seldom occur, to achieve last bit of efficiency in retrieval, free text retrieval within the controlled vocabulary based retrieval is incorporated. In this process, title and abstract of the documents retrieved against the basic subject of the query are traversed. The FIND command does this function. Search steps required for a query COKE RATE IN BLAST FURNACE can be illustrated as follows:

SELECT	BLAST FURNACE*	(A)
FIND	COKE RATE IN A	(B)

This method also enhances the retrieval for concepts which are identified by their process. Despite the fact that BURDENING is not a less commonly used concept in the literature. METADEX uses neither this term nor any other preferred term. Without free text retrieval, the strategy would be:

SELECT	BLAST FURNACE*	(A)
SELECT	GAS FLOW	(B)
SELECT	CHARGING	(D)
COMBINE	A AND (B OR C OR D)	(E)

But with free text retrieval, the same could be modified into:

FIND	BURDEN IN A	(F)
COMBINE	E OR F	(G)

It would be surprising to note that the later search strategy retrieves quite a good number of documents which are not retrieved by the earlier one. However, to examine the retrieval effectiveness, the concerned requesters were asked to compare the search results of the both search strategies. The search strategy involving free text retrieval yielded high recall value. Since free text retrieval considerably affects the response time, its use should be restricted to resolve critical queries.

Formation of Resultant Set

Query language of sequential processing differs from that of simultaneous cognitive processing. While the earlier directly applies Boolean algebraic concepts, the latter interprets set constructs in terms of Boolean algebraic concepts. COMBINE command forms a resultant retrieved set from sparsed search sets representing various search terms. This command accepts queries coded in the form of valid Boolean function represented in disjunctive normal form. Boolean connectors can be either spelt in full form as AND, OR, NOT or in their respective symbols designated as +,/,∧ . Various sets used in COMBINE command should have already been generated either by EXPAND-SELECT or by SELECT command. On the other hand, validity of the search expressions formulated during the pre-search session are tested on trial-and-error based method by moving in the order of increasing complexity. Trial-and-error based method offers two more patterns of formulating search queries:

i) the basic set may be identified first and then other sets added one by one; and

ii) various combinations of any two sets using different connectors can be done and repeated for three, four sets etc.

Thus the searcher could realize the co-occurrences of two or more concepts in the document base and finalise the search query through the trial-and-error method without knowing the exact relationship among the concepts. However, it is the searcher who should opt for the suitable method with respect to the topic of search.

Evaluation of the Retrieved Documents

Distinction between the characteristics of the pertinence and relevance was presented by Kemp[13]. A pertinent document is certainly relevant whereas a relevant document need not essentially be pertinent. Pertinence can only be judged by the requestor and the topical relevance, to some extent can be judged by the searcher. The DISPLAY command enables the searcher to scan the contents of the retrieved documents to judge the topical relevance. If any noise occurs in the retrieved set, the searcher may include one or more extra terms using AND operator in which case the searcher may ensure that the modification does not fall out. An alternative approach for removing the unwanted portion from the retrieved set is to introduce NOT operator with the appropriate term. In case the retrieval is found to be totally unsatisfactory, the search may have to be restarted from the scratch. There are several ways to lift up the precision factor whereas recall factor often remains vague. When the recall value becomes too low, it could be perceived by the requestor or by the experienced searcher and in other cases the recall factor often goes out of notice causing fall out in the retreival. The user feedback would facilitate refining the queries for better recall if the user is well aware of the amount of publications in his field. Fall out may also happen due to inconsistency of manually assigned keywords in the host database. In such cases, the fall out remains irrecoverable which is generally acceptable factor in controlled vocabulary based system. This does not mean that free text retrieval does not affect recall factor at all.

CONCLUSION

The searching pattern described in this paper evolves from various alternative approaches realized in compromising the search system capabilities and the indexing language of METADEX. Current state of the search system necessitates consultation of the thesaurus for generically and semantically related terms. However it is proposed to incorporate THESAURUS feature. The physical storage structure of THESAURUS is quite complicated to cope up with the dynamic updating. The QUILL online system[14] based on ordering of semantic relationships is being attempted to implement on Multi-indexed Access Method (MSAM). Once it is done, it will enable the searcher to have the THESAURUS displayed where all generically as well as semantically related concepts together with the number of postings in the document base will appear. Through the THESAURUS, it is also aimed to facilitate searches with both hierarchically lower and higher concepts for a given search term. Currently SDI search service from monthly updates of METADEX are being brought out for about 175 user interest profiles. Retrospective search service is however limited to one year volume of METADEX at a time due to limited availability of mass storage.

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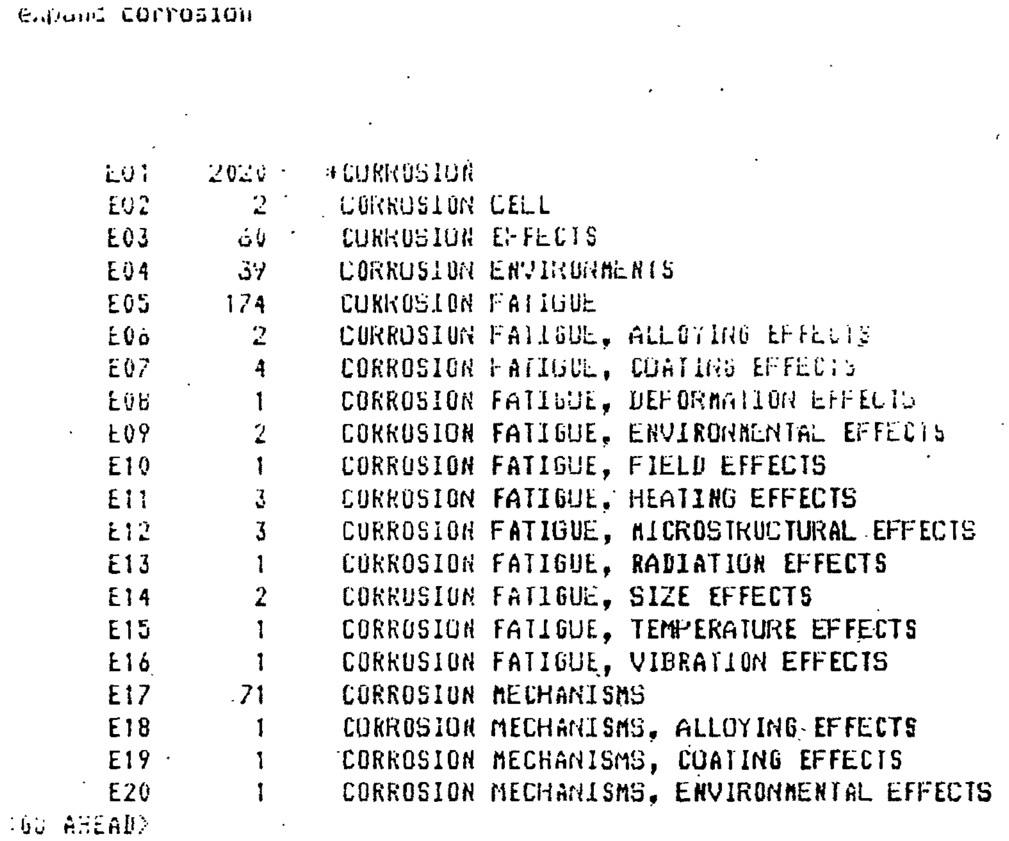


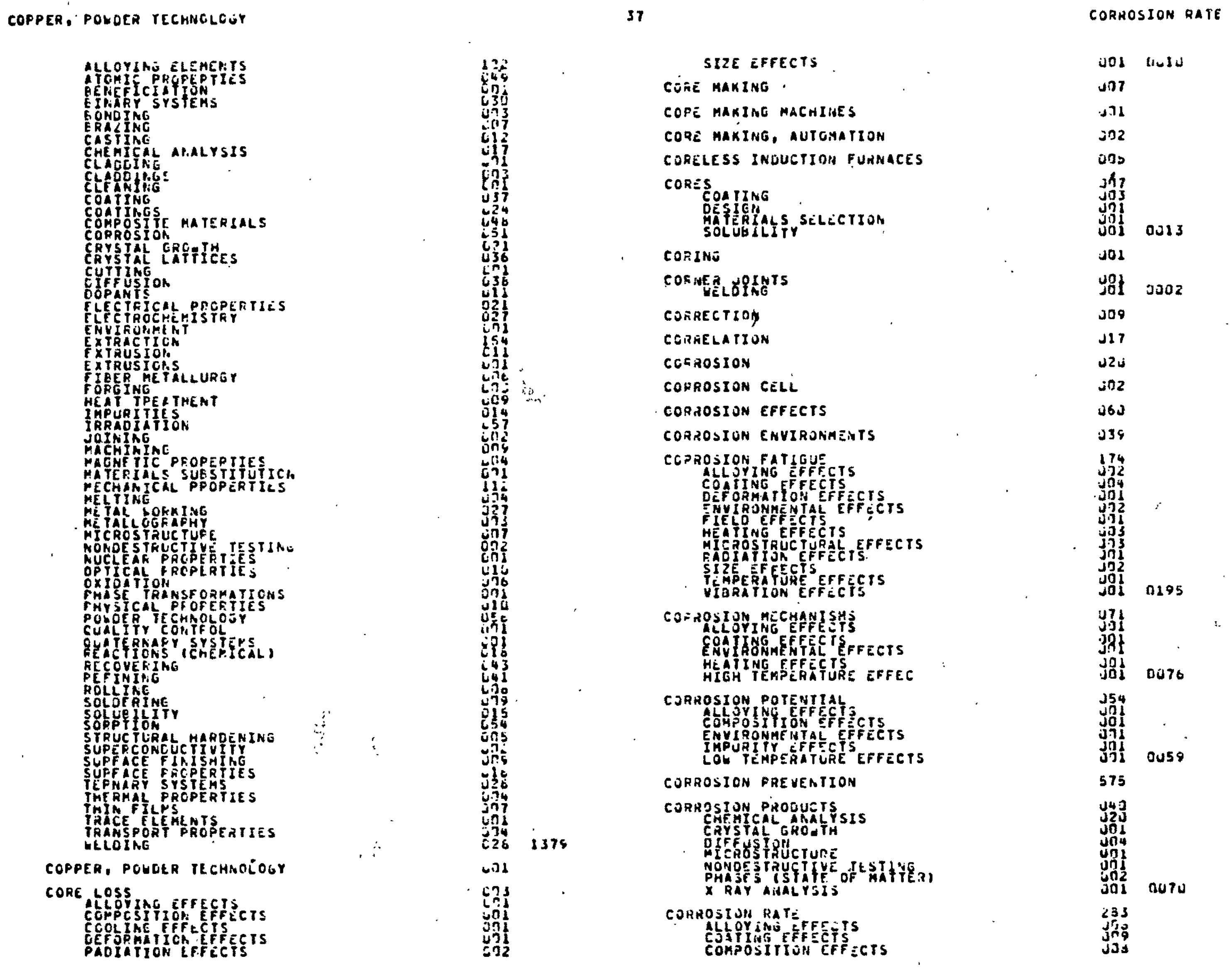
```
expand corrosion



      E01     2020    +CORROSION
      E02        2     CORROSION CELL
      E03       60     CORROSION EFFECTS
      E04       39     CORROSION ENVIRONMENTS
      E05      174     CORROSION FATIGUE
      E06        2     CORROSION FATIGUE, ALLOYING EFFECTS
      E07        4     CORROSION FATIGUE, COATING EFFECTS
      E08        1     CORROSION FATIGUE, DEFORMATION EFFECTS
      E09        2     CORROSION FATIGUE, ENVIRONMENTAL EFFECTS
      E10        1     CORROSION FATIGUE, FIELD EFFECTS
      E11        3     CORROSION FATIGUE, HEATING EFFECTS
      E12        3     CORROSION FATIGUE, MICROSTRUCTURAL EFFECTS
      E13        1     CORROSION FATIGUE, RADIATION EFFECTS
      E14        2     CORROSION FATIGUE, SIZE EFFECTS
      E15        1     CORROSION FATIGUE, TEMPERATURE EFFECTS
      E16        1     CORROSION FATIGUE, VIBRATION EFFECTS
      E17       71     CORROSION MECHANISMS
      E18        1     CORROSION MECHANISMS, ALLOYING EFFECTS
      E19        1     CORROSION MECHANISMS, COATING EFFECTS
      E20        1     CORROSION MECHANISMS, ENVIRONMENTAL EFFECTS
:GO AHEAD>
```

Exhibit 1
Display of the Term Dictionary for the term
CORROSION

Exhibit 2
A Sample Image of the Term Frequency Record



```
COPPER, POWDER TECHNOLOGY                  37                  CORROSION RATE

        ALLOYING ELEMENTS                  122
        ATOMIC PROPERTIES                  049
        BENEFICIATION                      001
        BINARY SYSTEMS                     030
        BONDING                            003
        BRAZING                            007
        CASTING                            012
        CHEMICAL ANALYSIS                  017
        CLADDING                           001
        CLADDINGS                          003
        CLEANING                           001
        COATING                            037
        COATINGS                           024
        COMPOSITE MATERIALS                046
        CORROSION                          051
        CRYSTAL GROWTH                     021
        CRYSTAL LATTICES                   036
        CUTTING                            001
        DIFFUSION                          036
        DOPANTS                            011
        ELECTRICAL PROPERTIES              021
        ELECTROCHEMISTRY                   027
        ENVIRONMENT                        001
        EXTRACTION                         154
        EXTRUSION                          011
        EXTRUSIONS                         001
        FIBER METALLURGY                   006
        FORGING                            003
        HEAT TREATMENT                     009
        IMPURITIES                         014
        IRRADIATION                        057
        JOINING                            002
        MACHINING                          009
        MAGNETIC PROPERTIES                004
        MATERIALS SUBSTITUTION             001
        MECHANICAL PROPERTIES              112
        MELTING                            004
        METAL WORKING                      027
        METALLOGRAPHY                      003
        MICROSTRUCTURE                     007
        NONDESTRUCTIVE TESTING             002
        NUCLEAR PROPERTIES                 001
        OPTICAL PROPERTIES                 010
        OXIDATION                          006
        PHASE TRANSFORMATIONS              001
        PHYSICAL PROPERTIES                010
        POWDER TECHNOLOGY                  006
        QUALITY CONTROL                    001
        QUATERNARY SYSTEMS                 001
        REACTIONS (CHEMICAL)               016
        RECOVERING                         043
        REFINING                           041
        ROLLING                            006
        SOLDERING                          079
        SOLUBILITY                         015
        SORPTION                           054
        STRUCTURAL HARDENING               005
        SUPERCONDUCTIVITY                  002
        SURFACE FINISHING                  009
        SURFACE PROPERTIES                 016
        TERNARY SYSTEMS                    026
        THERMAL PROPERTIES                 034
        THIN FILMS                         007
        TRACE ELEMENTS                     001
        TRANSPORT PROPERTIES               034
        WELDING                            026   1379

    COPPER, POWDER TECHNOLOGY              001

    CORE LOSS                              003
        ALLOYING EFFECTS                   001
        COMPOSITION EFFECTS                001
        COOLING EFFECTS                    001
        DEFORMATION EFFECTS                001
        RADIATION EFFECTS                  002

        SIZE EFFECTS                       001   0010

    CORE MAKING                            007

    CORE MAKING MACHINES                   001

    CORE MAKING, AUTOMATION                002

    CORELESS INDUCTION FURNACES            005

    CORES                                  047
        COATING                            003
        DESIGN                             001
        MATERIALS SELECTION                001
        SOLUBILITY                         001   0013

    CORING                                 001

    CORNER JOINTS                          001
        WELDING                            001   0002

    CORRECTION                             009

    CORRELATION                            017

    CORROSION                              020

    CORROSION CELL                         002

    CORROSION EFFECTS                      060

    CORROSION ENVIRONMENTS                 039

    CORROSION FATIGUE                      174
        ALLOYING EFFECTS                   002
        COATING EFFECTS                    004
        DEFORMATION EFFECTS                001
        ENVIRONMENTAL EFFECTS              002
        FIELD EFFECTS                      001
        HEATING EFFECTS                    003
        MICROSTRUCTURAL EFFECTS            003
        RADIATION EFFECTS                  001
        SIZE EFFECTS                       002
        TEMPERATURE EFFECTS                001
        VIBRATION EFFECTS                  001   0195

    CORROSION MECHANISMS                   071
        ALLOYING EFFECTS                   001
        COATING EFFECTS                    001
        ENVIRONMENTAL EFFECTS              001
        HEATING EFFECTS                    001
        HIGH TEMPERATURE EFFEC             001   0076

    CORROSION POTENTIAL                    054
        ALLOYING EFFECTS                   001
        COMPOSITION EFFECTS                001
        ENVIRONMENTAL EFFECTS              001
        IMPURITY EFFECTS                   001
        LOW TEMPERATURE EFFECTS            001   0059

    CORROSION PREVENTION                   575

    CORROSION PRODUCTS                     043
        CHEMICAL ANALYSIS                  020
        CRYSTAL GROWTH                     001
        DIFFUSION                          004
        MICROSTRUCTURE                     001
        NONDESTRUCTIVE TESTING             001
        PHASES (STATE OF MATTER)           002
        X RAY ANALYSIS                     001   0070

    CORROSION RATE                         283
        ALLOYING EFFECTS                   056
        COATING EFFECTS                    009
        COMPOSITION EFFECTS                003
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A NEW STRATEGY FOR OUT-OF PRINT MATERIALS: NON-MARKET APPROACH

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The average cost of procurement of out-of prints in India from University Microfilm International has been found to be 2461% higher than the actual cost of titles. In this perspective, a strategy has been suggested that should ensure a economical procurement of out-of-prints. It is based essentially on tapping of non-market sources.

INTRODUCTION

Even though any talk about out-of-prints in the era of computers and information technology sounds primitive and trite, a discussion on evolving new strategies for meeting library requirements of out-of-print material would not be out of place. Besides, such a discussion in the context of soaring prices of out-of-prints and dwindling library budgets would be very topical.

Many studies have been conducted in the past on out-of-prints[1-6]. These have been concerned primarily with problems of procurement in the context of traditional librarian-vendor approach to out-of-prints. To improve their availability, Tomilson[1] recommended selective reprinting of out-of-prints. Piekarski[2] stressed the importance of market sources and sound librarian-vendor relationship for getting better results. Mitchell [3-4] advocated the need for performance evaluation of out-of-print dealers and Kim[5] recommended advertising in book trade journals for achieving a higher success rate. Lynden[6], while narrating the Standford University experience, suggested measures for reducing the cost of procurement. Perez[7] emphasized the role of non-market sources in procurement, viz. microfilming and exchange of publications and cited in this regard the role of University Microfilms International and United States Book Exchange.

ESCALATING COSTS

According to Leonard[8], acquisition of out-of-prints on microfilms from University Microfilms International (UMI) should be the last resort because of the high cost involved.

To have an idea about the extent of excess price that UMI currently charges over the actual cost of publication, a survey was conducted by us. A total of 400 titles as listed under alphabets, B, N, chosen randomly, in the UMI Out-of-Prints Catalogue, 1983 were drawn as a sample. The availability of these titles in the collection held in NPL library was checked and in all such cases where the out-of-prints were available in the NPL library the prices paid by NPL were compared with the prices listed in the catalogue. It was found that as many as 175 titles were available and the prices quoted by UMI were exorbitantly high.

The extent of extra charge over the actual cost ranged between 142 and 18300%, as per analysis of the data from the sampling. The average of percentage extra charge is 2461 and the standard deviation is ± 3012.41 (Table 1).

The results of the survey indicate that in addition to the escalating costs, a large percentage of out-of-prints (40% in the survey) are available from the resources held in large libraries. But so far no one has reported on the need for searching them from libraries. Although searching by library entails persistent effort, given a systematic approach, utilization of library resources holds the key to reducing procurement costs. The costs of out-of-prints are soaring high and library budgets are shrink-

Table 1

Excess Price Charged by UMI for Out-of-Print Publications

Number of Out-of-print Titles in the sample	Number of Titles Available in NPL Library	Availability %	Excess Price Charged, %		
			Range	Mean	Standard Deviation
400	175	40	142 to 18300	2461	± 3012.41

ing. It is in this context that the need for evolving an alternative strategy is considered significant.

THE NEW STRATEGY

Networking of libraries and putting the existing library resources to cooperative use through decentralized acquisition and centralized service should be evolved as the alternative system. The user library could have a photocopy of the out-of-print title held by another library in the network. The process of searching and providing photocopy service could be undertaken from a central point, which should also serve as the apex body. About 40-50% requirements could be met in this manner and the rest through centralized acquisition with funding from the state.

Since the strategy proposed above is envisaged as a cooperative venture, its operation would be on non-profit basis. Availability of photocopy surrogates of out-of-prints in this manner would certainly cost less than the ones procured from the UMI.

However, the protagonists of centralized acquisition would never appreciate the idea of decentralized acquisition for reason of inherent drawbacks in decentralized acquisition, such as inadequate collection and inefficient service. But when demands exceed resources, adjustments on limitations in service become inevitable. While a developed nation can afford expenses on centralized acquisition, developing and underdeveloped countries have to adopt a strategy based on exploitation of their in-house resources first to the fullest extent. Limitations in service on account of decentralized acquisition could be overcome by the application of computers and information technology. So far, computers are being used primarily for replacing manual efforts in library functions. Here is an example of the use of computers for applications not feasible through manual operations.

CONCLUSION

A suggestion has been put forward to bring down the costs of procurement of out-of-prints using non-market sources. It envisages cooperation from established libraries for sharing their resources in the development of a complementary collection. A central agency is envisaged as the nodal point for giving shape to this concept. Such a model already exists in INSDOC, but for periodicals only. Serious thought needs to be given to the development of proposed system. The necessary initiative could come from INSDOC and national library associations in the country.

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COMPUTER APPLICATIONS TO LIBRARY AND INFORMATION WORK AT THE TECHNICAL INFORMATION CENTRE, BHEL, CORPORATE RESEARCH & DEVELOPMENT DIVISION

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BACKGROUND

The Technical Information Centre (TIC), at Bharat Heavy Electricals Limited (BHEL), Corporate R&D Division at Hyderabad is a company-wide information facility. The TIC: acquisitions policy encompasses information relevant to the product profile of BHEL as a whole. The TIC provides a number of library and information services primarily to research, product development and engineering services personnel in the different manufacturing plants, projects divisions, project sites and to research groups at the Corporate R&D Division. A long term objective of the TIC is to develop into a national information centre for power engineering and energy related subjects.

Several factors have led the TIC to apply computers to some of its library operations and information services. Some of these are:

i) The need to create a machine-readable data base of bibliographic information relevant to the product profile of the company, its R&D projects, and generally of information relevant to the company's interest in materials, technologies, problem solving methodologies and product applications.

Such a data base is considered to be a central resource of the system and services such as the SDI and retrospective search services are built around the availability of data base.

It is also envisaged that when all BHEL units in the country are interconnected to one another through computer communication networks, the centrally located data base will be accessible in an on-line mode for interactive searching from any of the units of BHEL. It is hoped that access to such a data base will greatly facilitate information searching and use in technical problem solving situation that is not uncommon in an engineering industry.

ii) Another important consideration for applying computers is the fact that the staff strength in the TIC (nine professionals and seven non-professionals) puts a high premium on professional staff time. If professional staff could be relieved from clerical chores so common in library routines, they could be better utilised for readers' services and other information services such as abstracting, indexing, literature searching, etc.

iii) A third important consideration leading to computer applications in the TIC is the availability of microcomputing facilities with capabilities that were once possible only on minicomputers or on main frames of an earlier age. The TIC has access to an UPTRON S 850 microcomputer with 128 k bytes of memory, a line printer of 300 lines per minute, four floppy disk drives each of 1 mega byte, a Winchestar drive of 32 mega bytes, a litter quality printer and a visual display terminal (VDT).

Development of programs on microcomputers costs a fraction of the cost of such development on a minicomputer or main frame. Further the turn around time in program development is much lower as compared to such development using a main frame system. Most minicomputers support high level languages such as COBOL, FORTRAN, BASIC and PASCAL.

Microcomputers like minicomputers can be used as stand-alone devices or as front-end devices to main frame systems.

The microcomputer has truly widened the scope of options available to libraries for the development of applications both for stand-alone use as well as for its use as front-end devices. Even if a system has ultimately to be implemented on a main frame, program development can begin with the microcomputer. In fact some of the programs developed at the TIC will ultimately be transported for implementation on a main frame.

APPLICATIONS

The TIC has implemented the following applications

(1) An interactive, microcomputer-based book acquisition system, and

(2) An integrated system for

- i) data base creation and maintenance;
- ii) batch processed SDI searching;
- iii) interactive searching of the cumulated data base; and
- iv) production of hard copy for a conventional current awareness abstracts service

A discussion of the applications and benefits derived follows.

The Book Acquisition System

The System is operational on a Texas Instruments, TI/990 microcomputer having 128 k bytes of memory, 2 floppy drives of 256 k bytes each, a dot matrix printer and a visual display terminal (VDT).

The system is menu-driven, i.e. it displays all the functions it is capable of on the VDT and expects the user to specify the function he wishes to invoke. Each function, in turn, has several sub-functions which are also displayed on the VDT. Here again, the system requests the librarian to make the desired choice.

The functions which the system is capable of are:

- Add an item to the on-order file
- Print purchase orders
- Receive or cancel an order
- Search for an item in the on-order file
- Modify records in the on-order file
- Create fund accounts
- Print a fund accounts report
- Create and maintain the purchase order no. file
- Create and maintain a vendor file
- Print accessions list
- Clear the on-order file records for items received/cancelled
- Print fund activity reports between any two dates
- Print follow-up reminders for outstanding orders
- Add invoice, foreign exchange draft and vendor report information to on-order records
- Send reminders to the bank for issue of foreign exchange drafts pending against 'A' form applications
- Print vendor performance reports between any two dates

The functions listed above are self-explanatory and are commonly understood functions in a typical acquisition system. However, the system as implemented provides a number of features that are not easily possible in a manual system. These are described below:

Interactive Data Entry and Duplication Checking for New Orders

When the librarian chooses to invoke the function to add a new item to the on-order file, the system responds to this by asking for information about the new item in a step-by-step fashion. For instance, it first asks for the author of the new item that is to be added, following this it asks that the title be entered. When both the author and title are entered, the system then matches the two input data items with the authors and titles of all other data items already in the on-order file. The purpose of the matching is to detect inadvertent duplication. The system displays on the VDT all other books by the author now being input which are already available on the on-order file. In doing so the system ignores initials and forenames of the author and only matches the surnames. This avoids the possibility that in some items the name of a given author is entered in full, e.g. Roberts, Kenneth H while in other entries it is entered as Roberts K H.

More important than checking for duplication by surnames of authors, the system compares the input title with the titles of all other items already in the on-order file. In doing this the system checks whether the input title is either exactly the same as one already in the on-order file of whether the input title is a fragment of an existing title already in the file. If either of these conditions are satisfied, the system displays such items on the VDT and asks the librarian to decide whether he would like to continue with the new order or suspend action on adding the new item to on-order file.

The checking of whether the input title is a fragment of an existing title in the on-order file is an important feature and adds an extra element of flexibility to duplication checking not normally possible in manual systems. An example should make this clear. Assume that the title 'Developments in Flow Measurement: Proceedings of the first International Conference on Flow and Its Measurement in Industry, Chicago, April 1982' is already on the on-order file. Assume also that at some later date a new request is received asking that the title 'Development in Flow measurement' should be acquired. When this title is input, the system alerts the librarian to the existence of the earlier title since the input title is a fragment of the earlier title. When the librarian is thus alerted he may decide to make another check before proceeding with the new item. The system thus provides checks against possible inadvertent duplication. We have found that this extra feature not possible in manual system is useful in considerably minimizing inadvertent duplication if not completely eliminating it.

A complete list of data items input during interactive data entry, i.e., date of the reminder, date ordered and a flag to indicate that a reminder has been sent are program generated and stored in the on-order record for a given item.

During the interactive data entry, the system expects that one of two kinds of cost to be provided as input: (1) An encumbrance cost or list price or (ii) The actual cost of the publication. The list price is the price as verified from the publishers' catalogue or sources such as the Books in Print, Publishers' blurbs, reviews, etc.

The cost price of a book or the actual amount paid is to be input only when the book is being paid for in advance. One of the two costs have to be input at the time of entering a new item to the on-order file otherwise the system refuses to proceed with the order.

The list price is shown as commitment while the cost price is shown as an expenditure in the fund account report.

Receiving of Books

When a book ordered is received, the 'Receive of Cancel an order' function is invoked. The system then asks for the order number following which it seeks the item in the on-order file and displays the bibliographical details for the librarian to check whether the deals in the book received match with the item in the on-order file. The system then checks whether the item was paid for in advance. If this is the case, the system then prints a letter to the Accounts Department intimating them of the fact that an item for which an advance payment was made has been received and that the outstanding advance payment may now be reconciled. This kind of a requirement is typical of libraries in India were the accounts expects to know of receipts against advances paid. In addition to the letter requesting reconciliation of advances the system also prints a letter to the requester of the publication received that the book asked for by him has arrived and that he may borrow the book.

In the case of a book for which advance payment has not been made, the system prompts the librarian to input the cost as given in the invoice. The system then checks the cost as in the invoice with the amount input as list price. If there is a variation of more than 30%

between the two amounts, an alert is displayed on the VDT. The librarian can take a decision whether to proceed with the receipt or not to receive the item until a price proof is obtained from the vendor, the publisher or other source.

The system then asks that the discount percentrage and postage costs, if any, to be input. Using the invoice cost, the discount and postage, the total amount of the invoice is calculated and displayed to be cross checked with the amount shown on the invoice.

List price, cost price and cost as shown in the invoice are all input in the original currency i.e. US dollars, UK pounds, etc. A conversion to Indian rupees is made by the system using the Good Offices Committee rates.

The function to receive books also provides the option to receive part of an order. When a multi-volume publication is ordered, it is likely that only some of the volumes are supplied. When part of an order is to be received, the system asks for details of the part actually received and the details of the part yet to be received. The system then acknowledges the part received and creates a new record for the part still to be received. The new record is then used in the function relating to the follow up of the outstanding orders.

The function also updates the fund account records. For items received without advance payment the committed amount shown against the fund is deducted and the actual cost as per the invoice is added to the spent amount for that fund.

Follow-up of outstanding orders

One of the most important benefits of the acquisition system is the ease with which follow-up is possible for outstanding orders. Once this function is invoked, the system asks for the data before which outstanding orders have to be followed up. Following this it scans the on-order file and prints reminders to vendors. The reminder letters are of two types: one for books paid for in advance and another for books that will be paid for only against supply. In the first case the full details of the advance payment (draft number, date and amount) together with the bibliographical details and vendors address are printed. In the second case the reminder letter contains the bibliographical details and the vendor's address.

The follow-up program flags each item for which a reminder is sent and the date of the reminder is stored in the on-order file record for that item. A reminder for the same item will not be printed until the expiry of 120 days following the first reminders.

The follow-up on outstanding orders is done once a month for all books that have been ordered six months or more before the date on which the function is invoked.

The follow-up function, it is felt, is very necessary in the Indian situation since not all vendors are organised enough to do their own follow-up with the publishers or wholesalers. We have found that periodic reminders to vendors do enable them to take up the matter with their sources of supply. The TIC expects a response to the follow-up reminder. If the TIC does not get a response it treats the order as cancelled and the item is reordered with another vendor. The cancellation and recordering is also accomplished by invoking the appropriate functions.

Management Information Reports

One of the important benefits of the computer-based acquisition system is the fact that it can produce on demand the following reports:

- A fund account report showing the allocation, commitment, expenditure and the balance for each fund.
- A vendors' performance report showing how vendors have fared between any two dates. The report shows the number of books supplied by the vendors between 1 to 15 days, 16-30 days, 31-45 days and so on until 76-90 days and 91 days and above. The report also gives the total number of books ordered during the period and the total amount paid to the vendors.

The vendor performance reports have been used to apprise vendors of their performance and in some cases to drop vendors whose performance has been very poor.

- A fund activity report, i.e., a report showing how many books were ordered, how many received, the amount commited and amount spent for each of the funds between any two dates.

Search facility

Another useful feature not easily possible in manual systems, is the fact that on-order file can be searched by a variety of keys. The keys are order number, author, author and title, vendor and requester. The search feature is useful in situations where the vendor supplies a book without quoting the order number. It is also useful to make a check of the on-order file to see if a given book supplied on approval is already on order. The search facility is very useful in searching for the books asked for by a given requester or ordered with a given vendor.

An important feature of the search facility available is that it is capable of truncated searching. Thus, for instance, a search can be made for all titles which have a given keyword or a fragment of a title or for an author with a given surname. The search may be made more specific by asking for a given title by a given author and each of these can be truncated.

Other benefits

As a result of the application, the acquisition librarian's paper work is considerably minimized. He does not maintain any files or office copies of orders or reminders. The order card is the only paper item handled manually. This is filed by the order number and when the book is received it serves as a shelf list card. Typing work in the acquisition section has almost completely been eliminated since the purchase orders, cancellations, reminder letters, etc. are all printed and addressed by the different programs.

A very important benefit has been the fact that the acquisitions librarian has more time now to ensure that every order goes through a thorough bibliographical check before it enters the system. More than this he has ample time to devote to scanning of reviews, publishers' blurbs, etc. All the acquisition work involving an approximate annual expenditure of Rs. 6.00 lakhs is handled by one librarian. The framework of an acquisition policy is now emerging since greater thought can be given to the qualitative aspects of collection building and the need to ensure a certain predictability to collection building.

The Integrated Data Base Creation, SDI, Interactive Search and Current Awareness System

The TIC has been providing, since 1978, a computer-based SDI service based on a data base created in-house through the scanning of journals, technical reports, patent abstracts, etc. The SDI till recently was implemented using ICL 2904 computer system. Together with the in-house SDI, the TIC has been producing a series of current awareness abstract bulletins called, RAPIDAWARE in 21 different subject fascicules covering the subject interests of BHEL as a whole. The current awareness bulletins were produced entirely manually.

It was realised that the clerical effort (keyboarding) and intellectual effort (abstracting, indexing) involved in the in-house SDI and current awareness service (CAS) was unnecessarily duplicated in providing the two services. The duplication was unavoidable since the logistics of the methods adopted for providing the two services was different. One was computer-based and the other manual precluding the integration of the clerical and intellectual effort.

A project was taken up to integrate the SDI and the CAS by developing a system satisfying the following requirements :

- One keyboarding operation for input of bibliographical data, abstracts, and index terms should enable production of the machine readable file to be used for SDI and CAS.
- The hard copy(master copy) of the CAS should be produced by the computer. This could be used to produce either offset masters or electronic stencils which would be duplicated.
- The machine-readable files should be cumulated and it should be possible to search the cumulated file or data base in an interactive fashion.

- The system should be capable of being implemented on a small computer and be capable of being used in conjunction with a future word processor.
- The system should utilise, as far as possible, file organisation techniques for efficient SDI and interactive searching.
- As a long-term measure the system should be capable of being upgraded for implementation on a minicomputer or main frame computer.

Keeping the above specifications in mind, a microcomputer-based system has been developed. The salient features of the system are described below

DATA BASE STRUCTURE

The data base has a directory-oriented record structure similar to the structure that is being used in the MARC records and several other database e.g. INSPEC. The international standard for bibliographic information interchange format has been followed to the extent of the basic structure, viz. fixed length directory entries, tagged fields and variable length data fields.

The directory of the record in the system developed is a fixed field of 112 bytes and each entry in the directory consists of a tag number identifying a specific data field followed by the starting character position of data in the variable length portion of the record.

TAG NO.	STARTING CHARACTER POSITON OF DATA PERTAINING TO TAG IN VARIABLE FIELDS

A total of 28 tags were identified as useful to describe the following types of documents : (i) books, (ii) journal articles, (iii) technical reports, (iv) patents, (v) standards. (vi) conference papers. The tagging scheme adopted drew considerably from the tagging scheme used in the INSPEC.

Data Capture

As stated earlier, one of the objectives of the system was to ensure that a single keyboarding effort should be resorted to produce both the SDI and CAS.

Keeping this objective in mind, it was decided to utilise key-to-floppy data entry devices to capture the data required for the two services. It was also decided that indexers/abstractors will provide the input on a well-designed input card that will be used directly by the keyboard operators. The data entry is being done on the UPTRON D 10 key-to-floppy device.

Search Methods

One of the basic approaches in bibliographic information retrieval is the creation of an inverted file to one or more keys or searchable elements of bibliographical records. It is customary to create inverted files for keywords or thesaural descriptors and authors. In some situations other keys such as author affiliations, coden, title words, etc. may also find a place in inverted files. Boolean logical expressions using the operators OR, AND, NOT are used to represent complex search strategies.

The system developed uses an inverted file of thesaural descriptors and free index terms. Other keys such as authors' names etc. have not been inverted in view of disk space limitations. The sequential file is further indexed to minimise search time.

The system creates an entry for each unit term of a compound descriptor and one entry for the descriptor as a whole. Thus for instance a descriptor such as 'Linear Induction Motors' would produce inverted entries for each of the unit terms, 'Linear', 'Induction' and 'Motors', and one for the term 'Linear Induction Motors'.

The rationale for generating entries both for unit terms as well as the bound term in full is as follows:

It is possible to search for a class of products, processes, or actions by merely specifying the focus term of the concept. For instance, in the descriptors 'Induction Motors', Synchronous Motors, Alternating Current Motors and Direct Current Motors, the term 'Motors' is the focus term while the other terms viz. Induction, Synchronous, etc. may be considered to be difference terms qualifying the focus. In some searches, it is necessary to be able to do a generic search for all kinds of motors. This is possible to be done in the search system developed by specifying the focus term, i.e. motors. The system, however, permits the search for a specific term such as 'Direct Current Motors' excluding all other motors.

In an industrial R&D environment where searches are predominantly for products and processes, it is considered useful to be able to do generic searches for a class of products. The generation of entries for unit terms enables such a facility. It is, however, recognised that generation of entries for unit terms results in entries for terms which may not be useful as search terms. Also such terms may cause retrieval of irrelevant items. It is necessary to adopt other controls to minimise the incidence of false retrieval. The controls generally adopted are:

(i) to search by group or class code in addition to searching by descriptors and unit terms;
(ii) to use NOT logic to restrict the retrieval; and
(iii) to ensure that entries for unit terms are generated only selectively using a stop-list or similar device.

The system developed has attempted to minimise false retrieval using the NOT logic as well as by the use of group codes.

The search logic used in the system utilises dedicated bit strings to represent documents posted to a particular key word. Thus for instance, if a keyword, say Boilers, has document numbers 126, 195, 203 and 512 posted to it, then a bit string is generated for this keyword and the 126th, 195th, 203rd and 512th bits of this bit string are made equal to 1. All other bits are put equal to 0. Boolean combinations are made between such dedicated bit strings generating a result bit string having only those bits equal to 1 which satisfy the logic of the Boolean operator.

Searching of the inverted file is accomplished first by a search of the index to the inverted file to determine the upper and lower bounds of search required in the inverted file. Once the bounds are obtained the inverted file is accessed using the binary algorithm to locate the specific entry.

The bibliographic file is stored in document number order. This file also has an index to it to minimise seek time to locate the record for a specific document number.

The SDI System

A user profile in the system comprises the following components:

- Profile number
- Name and address of SDI user upto a maximum of 175 characters
- Profile terms upto a maximum of 40 terms per profile
- Search combinations using Boolean operators.

Each of the profile terms in the SDI profile is searched in the inverted file and a bit string record indicating the document numbers posted to that term is created and stored on diskette. Each profile term thus generates a bit string record. The search combinations are then processed by recalling from the diskette the stored bit strings. Two or more such bit strings are combined using the logical operator specified in the search expression. The result of the logical operation is another bit string representing document numbers satisfying the search expression. This result bit string is also stored on diskette. The last search combination consolidates the results of previous search expressions and generates a final bit string representing the final set of documents that satisfy the various search expressions for the user. The last bit string is then used to seek randomly the documents from the bibliographic file and provide the SDI output to the user.

Interactive Searching of the Cumulated Data Base

In keeping with the objectives of the project a program has been developed that permits interactive searching of the cumulated bibliographic file using a simple command language

The commands are:

- SELECT
- COMBINE
- DISPLAY
- DISPLAY SETS
- PRINT

The SELECT command generates a prompt requesting the user to enter the keyword to be searched. Once this is done, the program searches the inverted file for the SELECTED keyword and displays on the VDT the number of items that are available in the file posted to the keyword. A typical response of the system, for instance, on SELECTING the keyword 'corrosion' may be as follows:

```
SET    ITEMS          KEYWORD

 1      35            CORROSION
```

This display simply indicates that there are 35 items in the file in which the term corrosion is an index term. This particular term may be referred to as Set 1 in future search operations.

Since the term CORROSION occurs as a unit term in several descriptors such as Pitting Corrosion, Scaling Corrosion, Erosion Corrosion, Corrosion Protection, etc., the result of SELECTing CORROSION in the system would be to create a set of documents indexed under all descriptors which have the unit term Corrosion. This is tantamount to doing generic search for all types of corrosion

The COMBINE command prompts the searcher to input a Boolean search expression. Here the user uses the set numbers created earlier on in the search. If, for instance, a user wishes to search for references on Boiler Corrosion he first creates two sets, one for each of the above two concepts by using the SELECT Command. These two sets are the COMBINED using the COMBINE command.

The result of the COMBINE command is output to the VDT. The result is assigned a set number and the VDT display indicates the number and the VDT display indicates the number of items retrieved as a result of the COMBINE command.

The DISPLAY command prompts the user to input the set of documents that he wishes to be displayed on the VDT. Following this it outputs to the VDT the bibliographical details including abstracts and descriptors of the references in the document set.

The DISPLAY command permits an evaluation of how useful a particular search set is. It enables the searcher to direct his search based on intermediate results of his search. He is enabled to decide whether to SELECT other keywords and/or COMBINE other keywords or sets or to ask for the output in case he is satisfied with the result.

The DISPLAY command recalls to the VDT all the sets created upto that point of time in the search. This command is required for the purposes of recapitulation since the VDT display lines are constantly being rolled out of the screen and there may be need to review the status of a search in order to proceed further with the search.

The PRINT command enables the output to line printer of a specified search set. The output contains the bibliographical details of the abstract and descriptors assigned to the each of the items in the set.

The interactive search facility developed is essentially meant for searching the cumulated in-house data base. Since the data base is highly selective and contains items relevant to the product profile, materials, technologies and applications relevant to and of interest to BHEL, it is envisaged that interactive searching will be used in response for information required in problem solving. Such searches have in fact, been done and have been found useful.

The data base being developed and the interactive search facility is considered as supplementing access to international data bases. The TIC has, in fact, been accessing multi-disciplinary data bases available on the DIALOG system at California, USA in an on-line mode using the international telex network. Such access is being done essentially for making comprehensive surveys of literature in specific areas where long-term R&D projects are planned or for problem-oriented searches requiring access to multi-disciplinary files.

Production of the Hard Copy for the Current Awareness Bulletins

The bibliographic file is first sorted by fascicule code (a code representing one of 21 different subject fascicules in which the Current Awareness Bulletins are produced) and within a fascicule by the feature heading assigned to different items.

The sorted file is then input to a print program which outputs A4 size pages of the different fascicules.

The output program accomplishes the following:

- It right-justifies the entries without arbitrarily breaking up words.
- If more than one entry has the same feature heading the heading is printed only once.
- A contents page for each fascicule is printed.
- Each page of the output corresponds to an A4 size page and can be used directly for offset plate making. Presently the output pages are being used as master copy to cut stencils electronically which are later duplicated to produce several copies of the CAS bulletins.

CONCLUSION

The acquisition system and the search system developed have proved the feasibility of applying microcomputers for library and information work.

The TIC proposes to develop a system for creating, updating, searching and printing of the Union Catalogue of Periodicals at BHEL. It is also on the look out for proven commercially available microcomputer software for periodicals control, cataloguing and circulation suitable for special libraries.

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EXTINCT AND ENDANGERED INDIAN SCIENTIFIC PERIODICALS

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Periodicals have been publishing in India for the last two hundred years. During this period, about seven to eight thousand scientific serials are estimated to have been published. Of these, some are already extinct and some are on the verge of extinction. Measures to be taken to preserve the near-extinct periodicals have been discussed.

The founding of the Asiatick Society of Calcutta in 1784 by Sir William Jones and about 30 British intellectuals ushered in an era of modern scientific research in India. *The Asiatick Researches,* the organ of the Society, as well as the first periodical to be published from India, was started in 1788. The periodical published learned contributions on all fields of knowledge including contributions in science, and thereby it achieved the distinction of becoming the first periodical in India to publish scientific contributions.

Pasvavali, a Bengali monthly, started publishing from Feb. 1822 by the Calcutta School Book Society, is the first scientific periodical published from India, scientific in the sense that it was devoted to animals. We shall discuss more about this periodical later.

The decade of 1820's saw the birth of a few more scientific periodicals, i.e. *Transactions, Medical and Physical Society of Calcutta (1825-45), Transactions of the Agricultural and Horticultural Society of India* (1829-41), and *Gleanings in Science* (1829-31).

Eversince, the growth of Indian scientific periodicals has been steady. Presently, the number of current Indian scientific periodicals including Annual Reports of scientific institutions and organisations, is above 2,000.

The total number of scientific periodicals including Annual Reports published in the country during the long span of about 200 years in English and regional languages is in the order of seven to eight thousand.

Of these periodicals, there are many which seem to have become extinct. References here and there provide evidence as to the existence of those periodicals in certain period of time. But today, there is no trace of any copy or any issue of that periodical anywhere in the world.

Dr. G. Bhattacharyya, a naturalist from Bengal, seems to have contributed a paper in the journal called *Wild Life* published from Agra in 1930's. But no library holding of India and abroad indicates the presence of this journal today.

In the *Friend of India* of November 14, 1850, p.731, there was an announcement, which reads as below -

"A New Medical Journal, The undersigned proposes to re-establish a Medical Journal, having the title of *Bengal Medical Record,* from Ist Jan. 1851. or 2nd of each succeeding month, and the subscription per annum is 20 rupees. Early intimations of approval and support are requested from all, who are of opinion, a Medical Journal in Bengal may be productive or good".

T. Hastings, Civil Asstt. Surgeon
East Burdwan.

N.B. - "All Communications to be addressed, post-paid, to the Editor, at Burdwan".

There is no trace of this periodical also anywhere in India and abroad. It is not known, whether the periodical was published at all, or ceased after the publication of an issue or several issues.

Such examples are plenty in the case of regional language scientific periodicals of India. Many periodicals which published in the 19th century or even in this century are extinct today. Why is it so difficult to establish? There may be several reasons for this

i) In many cases, librarians never found them worth subscribing.

ii) Scientists did not evince much interest in them. Even today this is so.

iii) Librarians also did not treat them properly specifically which they received free. It may be mentioned that periodicals received free are not to be accounted for before the audit party.

These periodicals were mostly in the private collection of individuals where they withered away with the passage of time.

Unless something radical is done, regional language scientific periodicals will continue to meet the same fate.

There are quite a few periodicals, copies of which are available not in India but abroad. A few examples of such periodicals are:

i) Forecast of the Bajri Crops, Department of Agriculture, Bombay 1923/24 -?

ii) Forecast of Bhadoi Crops, Department of Agriculture, Bihar and Orissa. Patna 1913–?

iii) Forecast of the Castor Seed Crops, Department of Agriculture, Bombay, 1924/25 -?

There are periodicals, only a few issues or incomplete run of which are extinct. In other words they are near-extinct.

In this category also, a very large number pertains to regional language periodicals.

As discussed earlier the first regional language scientific periodical published from India is *Pasvavali* i.e. Animals. The periodical published under the sponsorship of the Calcutta School Book Society. John Lawson collected the description of animals from various English books and W.H. Pearce translated them into Bengali. It was a monthly and each of its issues was devoted to a particular animal. The periodical stopped publishing with the 6th issue following the death of John Lawson.

It was again revived by R C Mitra sometime before 1834 and 16 more issues were published. The first six issues were printed in 1828 in the form of a book also.

Only a few issues of the journal are reported to be available in a personal collection.

Such examples are also not lacking in the case of English periodicals.

The Madras Quarterly Medical Journal can be cited as an example. During 1839-44, 6 volumes of the journal were published. Only the Medical College Library, Calcutta is having the first five volumes of the journal of which vol. 4 is incomplete. No library seems to possess the 6th volume.

Home and Homoeopathy - This periodical was the organ of the Bengal Allen Homoeopathic Association and published from Calcutta. Only vols. 6-8 published during 1930/31-32/33 are available in the National Library, the only library possessing this periodical. It is not known how many volumes of the periodical were published, or when did the periodical start or stop. Similar is the case with *Homoeopathic Directory* Vols.2-3 (1921-22), *Homoeopathic Outlook* 14-25 (1954-65) and many other Homoeopathic periodicals.

In this category itself, there are periodicals whose incomplete run are being held by several libraries. If those libraries cooperate, easily they can have the complete run of the same. For example, 7 issues of *Hyderabad Geological Series Bulletin* were published during 1937-1950. One library is having the first six numbers and another library is having the nos. 2,4,5, and 7. If both the libraries cooperate, easily both of them can have the complete set.

In some cases, only partial construction will be possible. For example, in all, 37 vols. of *Calcutta Journal of Medicine* were published during 1868 to 1919. At present, no library is having the complete run. Only fragmentary runs are avilable in different libraries. Taking the holdings of all the libraries, one can have volumes nos. 1-3 (complete) 4 (incomplete), 5-8 (complete), 11 (complete), 13-18 (complete), 21-23 (complete). No library is having volumes Nos. 9-10, 12, 19 and 20.

For the construction of the complete run, at times, we may have to take the help of some foreign countries as well. Three scientific periodicals were published from Goa in Portuguese.

Archivos de Escola Medico-Cirurgica de Nova Goa, Ser. A No. 1 (1927)-34(1961), *Ser B* Nos.1-23, (1927-51) and *Boletim Sanitario.* 1-5, 1916-20. Our country does not seem to possess the complete set. It is likely that some libraries in Portugal will possess them. Taking help of those libraries India can also have the complete set. If nothing worthwhile is done towards their preservation, the near-extinct periodicals can easily become extinct in future.

There are some ceased periodicals, the complete run of which are still available just in one or two libraries of the whole country. I would call this as endangered category. Examples are

Bengal Agricultural Journal 1-6, 1921-26
Atomic Energy Abstract, Nos. 1-23
Bombay Medical Journal 1-5(2), 1932-36.

Libraries in most cases are not aware that some of the periodicals which they are possessing in their collection are endangered. That is why there is every need to make them aware of this fact so that they can take the necessary care of these.

MEASURES NEED TO BE TAKEN

While determining the extinct, near-extinct and endangered category of Indian scientific periodicals, the first prerequisite is the compilation of a comprehensive list of all Indian scientific periodicals started publishing from 1788, which has been done by me for the period 1788 to 1965. It is probable that I have missed some extinct and other periodicals.

The compilation of a list of extinct periodicals is really a difficult task. Sources are very scanty and scattered. References to the extinct periodicals are available in the Book Reviews portion of many journals and newspapers. Here also, regional language periodicals have mostly been reviewed in the publication of the respective regional language alone. So, language barrier poses a formidable problem.

Scanning of the references given at the end of articles is another tiresome method, and fraught with the danger of committing serious mistakes. Because, in the references the place wherefrom a periodical is emanating is at times not given. Periodicals like *Indian Journal of Physics, Ayurvedlok* can easily be identified as Indian. Identification again, therefore, poses problems in case titles are like *Gasoil, Himalyan Geology,* and *Modern Fibres.*

Another important source of identifying the extinct periodicals is the gazette. The Copyright Act was passed in 1867 and thereafter the gazettes of various places like *Bombay Gazette* and *Calcutta Gazette* recorded the publications. There is no index to the gazettes and as such every issue needs careful scanning. Even from the gazette, at times it becomes quite difficult to identify a scientific periodical.

Books and articles on the history of science many a time dwell on periodicals.

Some enthusiasts have done a commendable job in this direction. One great example is Brajendranath Bandopadhyay. To compile a list of Bengali periodicals and newspapers published till 1867, he trotted throughout Bengal, visited all libraries and all important personal collections and thus presented the country with the most comprehensive list of Bengali newspapers and periodicals in his *Bangla Samayikpatra.* Such examples are not always available in other Indian languages. Neelameghan's work on the development of medical periodicals and medical societies in India also deserve mention. Some Ph.D. work has also been done and a few more are going on. It is not known to what extent they will deal with the extinct periodicals.

A pertinent question arises here. What should be our policy towards apparently extinct periodicals? If the policy is not to bother about them any more, there is then no need to trace them. If on the other hand, the policy is to trace them first in literature and then physically, then of course, a completely different course of action will have to be taken. The way of compiling the list has already been discussed. Once the list is prepared, they may be advertised in paper, if some of them are in existence, they may come to light.

Collection of rare documents is a regular activity in the Soviet Union. Every year people engaged in the job visit different parts of the country. Advertisements appear in the newspapers and other mass media. Quite a number of rare documents of value are collected in this process and the person donating the document is also rewarded.

Similar course of action can also be followed in our country.

For other types of periodicals discussed if we want to preserve them, or construct the complete run wherever it is possible, or inform the libraries to protect the near-extinct or endangered periodical, a central body is needed. If some existing libraries undertake the job, it is well and good. Otherwise a body needs to be created for the purpose. The body may be entrusted with the responsibilities mentioned above. In addition, it may keep in microform or any other suitable media the copies of all periodicals that need protection.

The number of sci-tech libraries in our country today is quite high, in addition there is the National Library as well as the National Science Library. So it can be expected that the periodicals of research value will be taken good care in future and hence there will be less chance of their extinction. Even popular science magazines in English like *Science Today* and *Science Reporter* are subscribed by many libraries of the country and as such they have little fear of becoming extinct.

The problem remains with the regional language periodicals. They have started coming out in large numbers. Who are going to subscribe and preserve these?

According to the Delivery of Books Act of 1956, the 4 libraries in India are to get copies of all periodicals free of charge. In reality, it is not happening. The deposition of periodicals to these libraries as reflected in the *Indian National Bibliography* speak of innumerable gaps. An agency in each state may be given the responsibility of procuring each regional language scientific periodical emanating from the State. Certain libraries, societies etc. may be selected and given the responsibility. For example, Kerala Bhasha Institute in Kerala can be made responsible for Malayalam periodicals, Assam Science Society for Assamese, Bangiya Bijnan Parishad for Bengali and so on. Along with the entrusting of responsibility, they should also be properly funded to do the job.

No organised attempt has so far been made in the country to preserve or protect the rare or near-extinct periodicals. If action is taken even now, many valuable documents can be saved. We are, no doubt late, but it is better late than never.

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A SIMPLE INFORMATION RETRIEVAL SYSTEM FOR RESEARCHERS

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Suggests a method for indexing reference cards. The well tested method ensures effective retrieval of reference cards.

Researchers handling thousands of reference cards find it difficult to pick precise references concerning particular subjects and topics. Many a time relevant references might be overlooked and it takes time and effort to locate them. Methods like edge punched cards [1], peek-a-boo[2] and coordinate indexing were devised to ease retrieval process; however, they are not in practice due to their complexity in preparation and usage. In this paper a new method is described for indexing reference cards. This method ensures picking of particular reference cards concerning one or more subjects and topics. The method has been tested over a decade several times and is found to be simple, effective and foolproof.

DESCRIPTION OF THE METHOD

1. A collection of reference cards is arranged in alphabetical order of authors.

2. Depending on the requirement and from the trend of the collection, different subjects are identified to which all references can be categorised. For example, subjects and topics of a bibliographical collection of an agricultural geneticist can be grouped under the following heads:

1. Method/Technique
2. Mechanism
3. Cereal crops
4. Pulse crops
5. Vegetables
6. Plantation crops
7. Quality
8. Yield
9. Genetics
10. Cytogenetics
11. Molecular biology
12. Cytology
13. Tissue culture
14. Physiology
15. Biochemistry
16. Hybridization
17. Theory
18. Review article
19. Monograph
20. Pathology
21. Nematology
22. Entomology
23. Pest/Drought resistance
24. Book
25. Statistics/Analysis
26. Specialization

3. A master card is prepared by dividing left hand margin along the width into the same number of divisions as the number of subjects recognised in step No.2. Approximately 25 numbers can be accommodated in a card of 8 cm width. The lines available on the card will be helpful in writing the numbers.

4. Numbers 1-9 can be written as such. Numbers 10-n can be written as 0,1,2,3,4,5,6,7, 8,9,0,1,2......n for 10,11,12,13,14,15,16,17,18, 19,20,21,22.....n respectively. These numbers can be identified easily because of the spatial separation.

5. From the title and abstract/content of each reference, different subject/topics are assigned to it under which that reference finds a place and is useful for retrieval.

6. With the help of mastercard, by placing the reference cards' bottom end aligned with that of the master card, the digit of subject (1 for Method/technique, 2 for Mechanism, 3

for General crops etc in the example given above), under which the reference can be located while retrieval, is posted on left hand side margin of reference card (Figure 1). Here also digits 10-n will be in single digit. Spatial separation between tens and twenties etc., offers their easy recognition.

7. All reference cards are prepared in the same way as above.

8. As new reference cards are written, the master card with subject number details preserved on it, can be used to incorporate the subject numbers on the newly written references. This practice, once habituated will help to find them quickly and effortlessly. Master card and subject number details should be preserved for further use in retrieval.

9. If a particular subject(s) is of importance, for those reference cards, the left hand corner may be marked with colored ink(s) to make it/them conspicuous.

10. If the existing collection consists of reference cards of unequal sizes, the above method can be used, limiting the space provided to accommodate maximum numbers that can be written on the smallest card(s) in the collection.

THE USAGE OF INFORMATION RETRIEVAL SYSTEM

If reference on research work related to resistance mechanisms recognised for pests on potato is required, handful (20-25) of cards are taken; the cards are held as a deck of playing cards, in between thumb and forefinger of both hands. They are slided slowly so that left hand margins are visible to the extent that the digits written on all of them are just visible (As displayed in Fig.1). Sometimes old cards will be sly. The remedy is to sprinkle little talcum powder to keep them fresh and for smooth sliding. Reference cards with digits allocated to 'mechanism', 'entomology' and 'vegetable crops' on the left hand side margin are required for retrieval. As indicated in the example these numbers will be 2, 5 and 22 and appear on the cards as 2..5....................2.........(top most reference card in Fig. 1). These reference cards are picked one by one gently. The procedure is repeated for remaining collection. After gaining little experience it usually takes (2-3) minutes to screen one thousand references for a combination of 3-4 subjects.

If the total number of subjects and topics recognised does not exceed 26, English alphabet of A to Z can be used instead of numbers.

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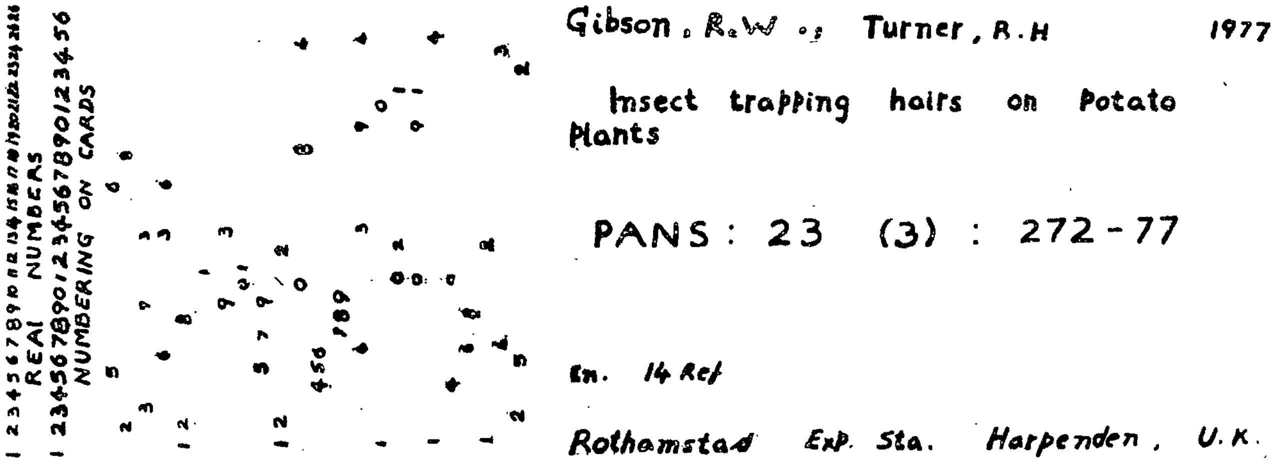

Gibson . R.W .; Turner, R.H 1977

Insect trapping hairs on Potato Plants

PANS : 23 (3) : 272-77

En. 14 Ref

Rothamstad Exp. Sta. Harpenden, U.K.

Fig.1 *A deck of reference cards prepared by the new method is displayed for retrieval. From left hand side, first card shows the actual numbers. Second card is the master card. Remaining cards are reference cards. The top most card is discussed in the text.*

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AUTHOR PRODUCTIVITY AND AREAS OF RESEARCH INTEREST : A CASE STUDY OF NIGERIAN ENTOMOLOGISTS

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A bibliography of entomological literature of Nigeria (1900-1973) comprising 1720 items has been analysed to study the relationship between author productivity and the areas of research interest. Of the 610 entomologists that contributed to the literature, 511 authors (83.8%) contributed only in one research area. A moderately strong correlation was found between the number of contributions made by each author and the number of subfields of entomology in which these contributions were made. Research productivity and areas of research interest of Nigerian entomologists appear to be directly related. It also appears that the scientists who contributed less than 20 publications have more diversified areas of research interest than those who contributed more than 20 publications.

INTRODUCTION

Numerous studies have been recorded on the structural and bibliometric analysis of literature of various fields. Most of these studies are concentrated in the area of science and technology, and social sciences, and to the disciplines which are well-established and recognised. With the exceptions of Aiyepeku[1], Alabi[2] and Toye[7], no serious attempt has been made to study the characteristics of subject literature of regional nature. In these and several other studies reported earlier, authorship characteristics have concentrated on productivity patterns of authors, testing of Lotka's law for these patterns and the degree of collaboration in publication. Only a very few studies have been reported on the aspect of correlation of author productivity and their interest in various subjects or various subject categories within the same discipline. Garvey and others found that about two-thirds of a sample of scientists continued to work in the same subject area and others moved into new areas of research[3]. Hurt in another study reported that the most productive environmental scientists tend to work in a well-defined area of environmental science[4]. These trends may vary from one discipline to another and from one environment of the scientists to another.

Therefore, this study was taken up to find out the relationship of author productivity and areas of interest of the scientists, taking the research productivity of Nigerian entomologists for the period 1900-1973, as a base. Although, Subramanyam[5] in his study of computer scientists, has reported that there is a strong correlation in the produtivity of a scientist and his interest in several subfields of computer science, but, I presume that in an environment like Nigeria, the productivity pattern and depth of interest would be reflected differently. My assumption is based on the simple reason that several complex and varying factors like personal, socio-economic, political and infrastructural surrounding the research environment of scientists, influence the patterns of research output and hence the productivity. Collaborative patterns and shifting interest of scientists from one area to another or several other research areas are also affected. These patterns are likely to be reflected if authorship data are analysed for a collection of publications of a specific subject originated from or on the problems of a specific country or region during a reasonable period of time.

METHODOLOGY

A bibliography has been compiled by Toye[6] comprising 1720 items on entomological research of Nigeria carried out during 1900 and 1973. The entries in the bibliography are arranged in a classified order under following subject categories:

1 Livestock and Public Health
2 Tree Crops
3 Legumes
4 Root Crops
5 Graminaceous Crops
6 Fibrous Plants
7 Vegetable and Herbs
8 Stored Products
9 General Pests
10 General Works
11 Beneficial Insects including Parasites and Predators
12 Non-Insect Terrestrial Arthropods

All the entries were scanned, relevant authorship data were extracted and recorded and statistically analysed. The Pearson product moment correlation coefficients were determined on three different files created for the analysed data.

RESULTS AND DISCUSSIONS

Authorship data as described above are presented in Table 1. Each author whose name

Table 1

Author productivity and distribution of authors and papers by number of subject categories

No. of papers (n)	Number of subject categories								Total No. of authors writing, in papers
	1	2	3	4	5	6	7	8	
1	320								320
2	80	12							92
3	46	15	2						63
4	25	6	1						32
5	11	10	2		1				24
6	4	5	1						10
7	6	3	2						11
8	5		1	1					7
9	2	3	1	1					7
10	3	2	1		1				7
11	2	1							3
12	2		1						3
13	2	1							3
14		3							3
15		1			1				2
16				1					1
17		1	1			1	1		4
18		3			1				4
20	1								1
21		1							1
22					1				1
24	1								1
25					1				1
26	1								1
27		1	1						2
31					1				1
38		1							1
42								1	1
43								1	1
53			1						1
63			1						1
Total	511	69	15	4	7	1	1	2	610
%	83.8	11.3	2.4	0.7	1.1	0.2	0.2	0.3	100.0

appeared in the by-line of the title was given full authorship. A total of 610 authors were identified contributing apparently 1748 items (actually 1720 items). The following three different files were created to study different productivity patterns:

1. Whole file; containing data for all the contributors;
2. File of high productive authors (authors contributing 20 publications or more);
3. File for low productive authors (authors contributing less than 20 publications).

Out of 610 authors in the first file, 320 authors (52.5%) contributed only one paper each. Each of the remaining 290 authors have produced more than one paper and these are the scientists who were likely to produce papers in more than one research area. The distribution of authors contributing more than one publication is given in Table 2. It is interesting to note that 511 authors (83.8%) contributed only to one of the twelve subject categories, but this group includes 320 authors who had contributed only one item each. Of the 290 multi-paper authors, 191 (65.9%) have contributed only to one subject category. About 5% of multiple-paper authors have contributed in four or more than four areas and 15 authors (5%) have contributed to three subject areas.

To test the relationship of productivity of authors and their contributions to a number of research areas, a correlation analysis was done on the data of three files as mentioned above. The data of analysis and relevant computations are given in Table 3. The Pearson product moment correlation coefficient for the data of first file, that is when all the authors were considered, was found to be + 0.50 which suggests that there is a positive correlation between the author productivity and number of research areas. Similarly when the correlation coefficient (r) was determined for the data of second file or for highly productive authors, the value of r was found to be + 0.13. Although lower than the value determined in the case of first file, it suggests that there is a positive relationship in the two variables. In the case of third file, containing authorship data for low productive authors, (authors who contributed less than 20 publications), the value of r was found to be + 0.70 suggesting a strong positive relationship between author productivity and areas of research interest of contributors. This supports the findings of Subramanyam[5] and contra-

Table 2

Distribution of multiple paper authors across subject categories

No. of subject categories	No. of authors	Percentage of authors
1	191	65.9
2	69	23.8
3	15	5.2
4	4	1.4
5	7	2.4
6	1	0.3
7	1	0.3
8	2	0.7
Total	290	100.0

Table 3

Computation of correlation coefficient

	X	Y	XY	X^2	Y^2
	66	3	198	4356	9
	53	3	159	2809	9
	43	8	344	1849	64
	42	8	336	1764	64
	38	2	76	1444	4
	31	5	155	961	25
	27	2	54	729	4
	27	3	81	729	9
	26	1	26	676	1
	25	5	125	625	25
	24	1	24	576	1
	22	5	110	484	25
	21	2	42	441	4
	20	1	20	400	1
Sub-total	465	49	1750	17843	245
	18	3.5	63	324	12
	17	4.75	81	289	23
	16	4	64	256	16
	15	3.5	53	225	12
	14	2	28	196	4
	13	1.33	17	169	2
	12	1.67	20	144	3
	11	1.33	15	121	2
	10	2.14	21	100	7
	9	2.14	19	81	7
	8	1.71	14	64	3
	7	1.64	12	49	3
	6	1.7	10	36	3
	5	1.38	7	25	2
	4	1.2	5	16	1
	3	1.24	4	9	2
	2	1.13	2	4	2
Sub-total	170	36	435	2108	104
Grand Total	635	85	2185	19951	349

dicts the investigations of Hurt[4] who found that there was no correlation in the case of environmental scientists. The details of calculations for determining the value of r are given in Appendix.

CONCLUSIONS

This investigation has shown that there is a positive relationship between research productivity of Nigerian entomologists and their areas of research interests, suggesting that they have their research interest in more than one area of specialization. Correlation, although positive, in case of highly productive authors, is poor which suggests that highly productive scientists tend to concentrate more on fewer areas of specialization than others. This is a typical characteristic of research productivity in a developing country where the scientists have limitations to get inducement to shift their interest from one area to another or several areas of research. A strong positive correlation for low productive entomologists might be due to higher degree of collaboration among their colleagues and peers in different areas of specializations. However, to find out the extent of influence and effect of collaboration on these variables, one needs a separate and detailed study. Generally, this can be concluded that the findings of this study support the findings of Subramanyam[5] that the Nigerian entomologists tend to shift their interests from one area to several areas of research.

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APPENDIX

Determination of coefficient of correlation (=r)

(a) for the whole file (for all the authors);

$$n = 31$$
$$\sum X = 635$$
$$\sum Y = 85$$
$$\sum XY = 2185$$
$$\sum X^2 = 19951$$
$$\sum Y^2 = 349$$

$$\bar{X} = \frac{\sum X}{n} = \frac{635}{31} = 20.48$$

$$\bar{X}^2 = 419.59$$

$$\sigma_x^2 = \frac{\sum X^2}{n} - \bar{X}^2 = \frac{19951}{31} - 419.59$$

$$= 643.59 - 419.59 = 224$$

$$\sigma_x = 14.97 \;\ldots\ldots\ldots\ldots \quad (1)$$

$$\bar{Y} = \frac{\sum Y}{n} = \frac{85}{31} = 2.74$$

$$\bar{Y}^2 = 7.52$$

$$\sigma_y^2 = \frac{\sum Y^2}{n} - \bar{Y}^2 = \frac{349}{31} - 7.52$$

$$= 11.26 - 7.52 = 3.74$$

$$\sigma_y = 1.93 \;\ldots\ldots\ldots \quad (2)$$

$$r = \frac{\sum XY - n\bar{X}\bar{Y}}{n\,\sigma x\,\sigma y} = \frac{2185 - 31 \times 20.48 \times 2.74}{31 \times 14.97 \times 1.93}$$

$$= \frac{2185 - 1740.84}{897.51} = +\,0.50 \quad ..(A)$$

(b) For second file (Highly productive authors);

$$n = 14$$
$$\sum X = 465$$
$$\sum Y = 49$$
$$\sum XY = 1750$$
$$\sum X^2 = 17843$$
$$\sum Y^2 = 245$$

$$\bar{X} = \frac{\sum X}{n} = \frac{465}{14} = 33.21$$

$$\bar{X}^2 = 1103.19$$

$$\sigma_x^2 = \frac{\sum X^2}{n} - \bar{X}^2 = \frac{17843}{14} - 1103.19$$

$$= 1274.5 - 1103.19 = 171.31$$

$$\sigma x = 13.09 \;\ldots\ldots\ldots \quad (1)$$

$$\bar{Y} = \frac{\sum Y}{n} = \frac{49}{14} = 3.5$$

$$\bar{Y}^2 = 12.25$$

$$\sigma_y^2 = \frac{\sum Y^2}{n} - \bar{Y}^2 = \frac{245}{14} - 12.25$$

$$= 17.5 - 12.25 = 5.25$$

$$\sigma_y = 2.3 \;\ldots\ldots\ldots \quad (2)$$

$$r = \frac{\Sigma XY - n\bar{X}\bar{Y}}{n\,\sigma x\,\sigma y} = \frac{1750 - 14 \times 33.21 \times 3.5}{14 \times 13.09 \times 2.3}$$

$$= \frac{1750 - 1627.29}{962.12}$$

$$= +\,0.13 \quad \ldots\ldots\ldots \quad (B)$$

(c) For third file (Low productive authors)

$n = 17$

$\Sigma X = 170$

$\Sigma Y = 36$

$\Sigma XY = 435$

$\Sigma X^2 = 2108$

$\Sigma Y^2 = 104$

$$\bar{X} = \frac{\Sigma X}{n} = \frac{170}{17} = 10.0$$

$$\bar{X}^2 = 100.0$$

$$\sigma x^2 = \frac{\Sigma X^2}{n} - \bar{X}^2 = \frac{2108}{17} - 100.0$$

$$= 124.0 - 100.0 = 24.0$$

$$\sigma x = 4.9 \quad \ldots \quad \ldots \quad \ldots\ldots \quad (1)$$

$$\bar{Y} = \frac{\Sigma Y}{n} = \frac{36}{17} = 2.12$$

$$\bar{Y}^2 = 4.48$$

$$\sigma y^2 = \frac{Y^2}{n} - \bar{Y}^2 = \frac{104}{17} - 4.48$$

$$= 6.12 - 4.48 = 1.64$$

$$\sigma y = 1.28 \quad \ldots\ldots\ldots \quad \ldots\ldots \quad (2)$$

$$r = \frac{\Sigma XY - n\bar{X}\bar{Y}}{n\,\sigma x\,\sigma y} = \frac{435 - 17 \times 10 \times 2.12}{17 \times 4.9 \times 1.28}$$

$$= \frac{435 - 360.4}{106.62}$$

$$= +\,0.70 \quad \ldots \quad \ldots\ldots \quad (C)$$

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PROBLEMS IN HANDLING JAPANESE PATENT INFORMATION

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Essential elements for identification of Japanese patents have been discussed and the existing citation practices in the Indian and foreign primary/secondary periodicals have been examined. Problems in handling Japanese patent information arising due to inadequacy in their citations have been highlighted with some practical examples and their solution suggested.

INTRODUCTION

Patent literature is indispensable for industrial and technological growth. In fact, it can be a true index of the technological advancement of a nation. In this connection USA, UK, France and Japan can be mentioned. The impact of patent literature on Japan's industrial progress within the last two decades has been remarkable. In 1960, Japan was importing technology having the import/export ratio 100 to 2.5. In 1975, this ratio became 100 to 22.5. Now, Japan is exporting technology to industrially advanced countries and for the first time in 100 years, America's lead in technology is being challenged by her. At present Japan accounts for 10.6% of the World's Gross National Product[1].

Patents are important not only for the development of the national economy but also for the international exchange of technology, products, services etc. Therefore, patents also promote international trade and technological developments. Japan holds about 10% of the total patents registered overseas and is one of the leading foreign holders of US patents. Japan issues 300,000 patents every year[2, 3].

Nowadays, patent literature has become an important part of every scientific and technical or industrial library. In many libraries, particularly those, situated in companies engaged in product development, the collection of patent literature gets priority over periodicals, reports, books, etc. Authors experience a member of difficulties in handling the Japanese patent information. Some of them are discussed below. The main objective of this paper is to bring these problems to the notice of librarians/information scientists, editors, user scientists, etc.

JAPANESE PATENTS

Since 1950, Japan is issuing two series of patents, i.e. the examined patent applications *(Japan Tokkyo Koho)* and unexamined patent applications *(Japan Kokai Tokkyo Koho)*. Each series of the patent applications is numbered every year starting from No. 1 and year is given in Showa (Current Japanese era).

PROBLEMS IN HANDLING JAPANESE PATENT INFORMATION

Patents from all the countries pose such common problems as patentese, patenting procedure, language barrier, restriction in use, difficulty in accessibility and less coverage in indexing and abstracting services. However, handling of Japanese patents, specially because of language barrier, poses some typical problems discussed below.

Indexing of Japanese Patents

Here, indexing means the recording of bibliographical data on the index cards etc. for maintaining the record of patent holdings for retrospective search of information. It generally includes the name of the patentee and the inventor, the title, the number and the year of patent and the country of its origin. Generally, the patent number is most important because it is an invariable tag. In the case of Japanese patents, the type of patent application, the patent number and the year of patenting are equally important and these three elements constitute the invariable tag for their identification. As discussed above, every year two patents are generally issued with the same patent number. However, they may be on the same or on different subjects. For example

Patent Number	*Year*	*Title of the patent*
47298	1980	Explosive with high stability.
47298	1980	Refrigerator

It is clear from this that one may not get the required patent if only the patent number is used as search term.

To have complete information, the Japanese patents must be indexed in the following way:

Sumitomo Heavy Industries Ltd. (1)

Ammonia-nitrogen removal by zeolite and its desorption (2)

Japan Kokai Tokkyo Koho 55 - 54086,
(3) (4) (5)

21 April 1980, 5 pp.
(6) (7)

1. Name of patentee
2. Title of the patent
3. Type of patent application
4. Year of the patent in Showa
5. Patent number
6. Date, month and year of the patent according to Christian era
7. No. of pages.

However most of the indexing services do not include all the essential elements discussed above.

Filing of Japanese Patents

As is well-known, patents are usually filed in numerical order under the country of origin but the filing of Japanese patents is a little different from the other patents due to the reasons mentioned above. The Japanese patents are filed in Japan in the first instance according to the type of patent applications i.e. *Japan Tokkyo Koho* or *Japan Kokai Tokkyo Koho*, then according to the year of patent followed by the patent number.

Citation of Japanese Patents in Primary and Secondary Periodicals

The primary purpose of citation is to identify the document referred to therein. If the citation of the document is wrong, the purpose of citation is defeated. Therefore, one should be very careful while citing a document in the primary or secondary periodicals because these periodicals are used by a large number of scientists.

Patents are generally identified by their patent numbers; but, for identifying Japanese patents some more information discussed above is required. However, citations of the Japanese patents in many periodicals are found incomplete in this respect.

(i) *Citation in Indian Periodicals*

In India, the citations of Japanese patents in primary and secondary periodicals are either incomplete or sometimes wrong. To illustrate this fact, the authors have selected some examples of Japanese patent citations from primary and secondary periodicals published in India as given below:

Some Examples from the National Index of Translations (Secondary Periodical)

NIT is a national index of translations and all the Japanese patents translated throughout India are announced in this index. It shows the indexing and citation practices followed by various libraries and information centres in India.

Japanese Patent 52-42789
Japanese Patent 48-54098
Japanese Patent 50- 9449

In the above mentioned examples, the types of patent application are not recorded, and so one cannot say whether a particular patent belongs to the examined or unexamined patent applications.

Examples from Primary Periodicals

S.No.	Name of the Periodical	Cited on page	Form of citation	Correct form of citation
1.	Indian Journal of Chemistry, Vol. 21B, Oct. 1982	900	Jap. Pat. 7,006,271 (1970)	Japan Tokkyo Koho 70-06, 271 (03 Mar. 1970)
2.	Indian Journal of Chemistry, Vol. 21B April 1982	377	Jap-Kokai 7778,888 02 July 1977	Japan Kokai Tokkyo Koho 77-78,888 (02 July 1977)
3.	Journal of Indian Chemical Society Vol. 59, Aug. 1982	924	Japan Kokai 1971-73, 10,046	This number seems to be wrong because it is too long.

In Foreign Periodicals

The citation of Japanese patents in primary and secondary publications at international level appears to be unsatisfactory. The citations in some of the secondary services, for example, *Chemical Abstracts,* include all the elements necessary for their identification, while in other publications, for example, *World Transindex, World Surface Coating Abstracts* etc., the citations are incomplete. To illustrate this fact, the authors have selected *World Transindex* as an example, because all the Japanese patents translated throughout the world are announced in this publication with the cooperation of various national agencies. This publication, therefore, can give some idea about the indexing and citation practices followed by various agencies in different countries. Some examples from the *World Transindex* are given below:

S.No.	Citations of Japanese Patents	Agencies
1.	JPN, (1974), JP/74-101561	International Translations Centre (ITC)-80-20031.
2.	JPN, (1978), JP/53-35334	British Library Lending Division (BLLD) : 8052-98 F
3.	JPN, (1982-1-08), JP/57-2699	Centre National de la Recherche Scientifique (CNRS) E 4073
4.	JPN, (1954), JP/29-3485	National Technical Information Service (NTIS) : N82-16180-3
5.	JPN, (s.d), JP/54-149951	IFP: U 044, 27, 00 FF
6.	JPN, (1969-09-25), JP/44-20751	SA - KOKOKU - 20751 - 1969.
7.	JPN, (1974), JP/49-11845	Bhabha Atomic Research Centre (BARC), TR-82-07.

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In the above mentioned examples, the types of patent application have not been recorded. This type of citation does not indicate whether the patent in question belongs to the examined or unexamined series. The International Translations Centre cites the year of the patent according to Christian Era as mentioned in example number 1, while others cite in *Showa* and according to the Christian Era as shown in other examples.

(iii) In Derwent Publications

An example of citation of Japanese patent from the Japanese Patents Report published by Derwent Publications Ltd., London is given below

J8 2060895
(1)

Di-basic acid bisglycerol esters as emulsifying agents:

Abstract of the patent
(2)

(J 55062046)
(3)

In this publication, in each entry of patent abstract, the number of the examined patent is cited on the top right corner (1) and then full title of the patent (2) is followed by the abstract, IPC code number etc. At the end of the abstract, the number of unexamined Japanese patent (3) is cited. In the case of the number of the examined Japanese patent, the year of patent is cited according to Christian era i.e. (82), while the year in the case of unexamined patent number is cited in *Showa* i.e. (55). In examined patent number, there is space between 8 and 2. In fact this space should come between the year and the patent number, for example, J82 060895. This space between 8 and 2 may create confusion in finding out the actual patent number. In unexamined patent number, neither space nor dash is given to separate the year and the patent number.

Acquisition of Japanese Patents

Incomplete or wrong citations create problems in the acquisition of Japanese patents. Generally, non-Japanese patents are procured by giving correct patent number in the procurement order. But Japanese patents cannot be procured correctly by giving only the patent number. Besides the patent number, the type of the patent application and its year are equally important. If any of these three essential elements is missing, there is risk of getting a wrong document.

The authors came across some such cases while handling Japanese patents. One of these cases of wrongly procured patent is given below

In this case, the indentor was interested in the former patent but he got the latter. It was identified only when it had already been translated.

The Japanese patents can be procured from HATSU-MEI-KYOKAI (Japan Institute of Invention and Innovation), 9-14 Taranomon-2-chome, Minato-ku, Tokyo 105, Japan[4]. The order must specify *Japan Kokai Tokkyo Koho* for unexamined applications and *Japan Tokkyo Koho* for examined applications. Besides the type of patent applications, the number of patent, the year of patent and complete title of the patent must be mentioned in the order form. The year of the patent prefixed to its number should be represented in *SHOWA* as

Patent No.	Type of Patent application	Year of patent	Titale of the patent
47,298	Japan Kokai Tokkyo Koho	1980	Explosive with high stability.
47,298	Japan Tokkyo Koho	1980	Refrigerator

given in the original patent. For example, Patent No.80-47298 should be ordered as 55-47298.

IDENTIFICATION OF JAPANESE PATENTS

In order to avoid language barrier, Japanese patent office has started giving the country code prepared by the International Organization for Standardization (ISO), the kind codes derived from the codes of Permanent Committee on Patent Information (PCPI) and the year according to Christian era on the patent for identification of country, type of applications and the year respectively[4]. Japanese patent office gives (JP) as the country code and (A) for *Kokai Tokkyo Koho* and (B) for *Tokkyo Koho* as kind codes on the top of the patent. In the patent index of *Chemical Abstracts*, (A_2) is used for (A) series and (B_2) is used for (B) series. The year of patent and the patent number are given together. Therefore one may take the whole number as patent number but it is not correct. First two digits represent the year of the patent and the rest – the number of the patent. For example,

Japan Tokkyo Koho	52	4062
(1)	(2)	(3)

Here (1), (2) and (3) refer to the type of application, year and patent number respectively. "SHOWA" 52 corresponds to 1977 in Christian era.

CONCLUSION

The examination of citation practices in various Indian and foreign primary and secondary periodicals reveals that the information given in the bibliographic entries or citations in respect of Japanese patents is inadequate for their correct identification, retrieval, procurement etc. Patent number, type of patent application and year form an invariable tag for correct identification of Japanese patents because of their two series and renumbering of each series every year from No. 1. Therefore, it becomes evident that these elements should be included in the citations.

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Annals of Library Science and Documentation 1985, 32(1-2), 68-72

CATALOGUE USE STUDY IN NATIONAL MEDICAL LIBRARY (NML)

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Discusses the results of a study made at the National Medical Library, New Delhi, by four trainees in the fourth training course in health librarianship. The study involved collection of information through questionnaire, observation and interview from the catalogue users of the National Medical Library for twenty days. The information collected is analysed and presented.

INTRODUCTION

Library catalogue is a systematically arranged searchable tool containing information about the resources available in a particular library for the purpose of identifying and locating them. Among the motivating factors that prompt catalogue use studies are: (i) the possibility of improving the conventional card catalogue in terms of the needs it fulfils; (ii) understanding the behaviour of library users; (iii) in the event of the decision to computerize the catalogue, provisions of guidance to library managers to determine the time for conversion and how it should be accomplished properly; and (iv) to provide justification for the money spent on the preparation and maintenance of the catalogue in a library.

DEFINITION

Catalogue use study is the study of catalogue users rather than the catalogue itself. Randall defined catalogue use study as "an intelligent study of the patrons themselves, their mental equipment, their background and their needs". The study is usually based on the data collected from the various users of the catalogue through questionnaire, observation and interview.

HISTORY OF CATALOGUE USE STUDIES

Catalogue use studies are not a novelty. Quite a number of studies have been reported in the literature. The earliest catalogue use study was carried out by Randall in 1930 which was published under the title "The uses of the library catalogue: A research project in the catalogues and the classifiers yearbook No.2, 1930 of the A.L.A. The literature had been growing steadily up to 1950s. Frarey, in 1953, listed 27 studies and in 1960 added 13 more studies. The major catalogue use study was undertaken by the A.L.A. in 1955-1956; popularly known as Jackson study, its results were published in 1958. During mid-1960's three major studies were undertaken and the results published. During 1970's, a number of studies were reported from U.K. Kirkelas[1] stated the following general objectives of catalogue use studies carried out up to 1970s:

(a) To determined what kinds of data have been accumulating from these numerous catalogue use studies.

(b) To evaluate the real or potential implication such studies have on the continuing development of the catalogue – whether in traditional card or book form or the computerized catalogue in future.

Kirkelas[1] also summarized the three important studies carried out in U.S.A.

(1) The University of Michigan study of 1967,

(2) The University of Michigan study of 1968-69, and

(3) The Yale University study of 1968-69.

The results of these studies conducted by Lipetz, Tagliacozzo and Palmer have lent support to many findings of earlier studies. At the same time, they have provided data giving new insights and leading to modification of the previous held views.

NEED FOR CATALOGUE USE STUDIES

From the above catalogue use studies it is possible to ascertain:

1. The types of users of the catalogue
2. Information seeking behaviour of the users
3. Purposes for using the catalogue
4. Types of information found in the catalogue useful for the users.
5. Performance of the catalogue.

Catalogue use studies help the library managers to improve the library cataloguing services and to increase the operational efficiency of the catalogue. Further, the study can be useful in justifying the time and money spent on the preparation and maintenance of the catalogue in a library.

NML CATALOGUE USE STUDY

This study was undertaken by four trainees in the fourth training course in partial fulfilment of their training in health science librarianship of the National Medical Library (NML).

SPECIFIC OBJECTIVES OF THE STUDY

The study was concerned specifically with the utilization of the catalogue of NML by the health science professionals, particularly research workers, postgraduates, practitioners and undergraduates, etc., their background and their information seeking behaviour with regard to the catalogue. The findings were meant to improve the existing library catalogue system.

LOCATION AND STRUCTURE OF THE NML CATALOGUE

The NML catalogue is located behind the counter and the reference section in the first floor of the main hall. The catalogue represents about 70,000 books and reports and 110,000 bound volumes of periodicals available in this library. The stocks of NML are open to health science professionals all over India. The users are mostly from the health science teaching institutions and hospitals situated in Delhi. The catalogue area is a scene of activity from 11 a.m. to 6 p.m. and the users enter to make searches of various kinds and durations, then leaving with different degrees of satisfaction. The NML catalogue is broadly divided into: (1) Books and monographs catalogue, (2) Reports catalogue, and (3) Serials catalogue.

Books and Monographs Catalogue

This is sub-divided into two portions:

1. Pre-1977: Containing material catalogued by the library before 1977, and
2. Post-1977: Containing material catalogued from 1977 to date.

This is a bipartite catalogue divided into name part and subject part. In the name catalogue, cards are filed alphabetically by authors and titles of books. In the subject catalogue, they are filed under Medical Subject Headings (MeSH) and the users can have access to the required books through MeSH (subject approach).

Reports Catalogue

This is also a bipartite catalogue, i.e. entries are made under author and subject sections. Once information about the material wanted is found in the card catalogue, the call number given on the upper left hand corner of the card, including any special location such as 'A' for Ayurveda, 'S' for serials, can be noted to locate the publication.

Serial Catalogue

Journals are listed alphabetically in the catalogue card kept in the cabinet placed adjacent to the book catalogue. It gives complete record of periodical holdings of the NML. Each entry in the record contains title of the journal and the specific volume(s) available along with the year(s) of publication.

METHODOLOGY

Sampling technique was employed in order to study costs and annoyance of catalogue users at reasonable levels. The desired representative sample was obtained by making careful observations of traffic in the catalogue area and by distributing questionnaires to the catalogue users. Out of the 150 questionnaires distributed, 100 were filled and returned. This random sample of 100 users was analysed and the results are presented in this study.

ANALYSIS

Catalogue Users

The actual user population of the catalogue could not be assessed, because there were approximately 1500 library users during the period of study and among them only 100 users were covered by us. The major categories of users were research scholars, practitioners, postgraduates, undergraduates, and non-medical personnel working in health science institutions. Out of the 100 catalogue users, 47 (47%) were research scholars and postgraduates; 40 (40%), practitioners; 7 (7%), teachers; 3 (3%), undergraduates; and 3 (3%) were non-medical professionals. NML being a focal point of the nation, its use by research scholars is very high.

Frequency of Catalogue Use

Out of the 100 users of the library, 29 use the catalogue frequently, 40 less frequently, 26 rarely and 5 not at all. Among them, the research scholars (14) used the catalogue most frequently. From interviews it was found that the Post-graduate students used the catalogue of NML rarely. The reason for this is that all of them belong to the All India Institute of Medical Sciences (AIIMS), which is in the same campus and has a very big library equipped with the latest editions of textbooks and journals.

Non-use of the Catalogue

Though it was not possible to identify with exactness of the non-users of the catalogue, it was found from the sample collected that 5% who did not use the catalogue stated the following reasons for not using the catalogue: (1) Nobody can understand the procedure, and (2) it is difficult to read the exact number of volume and year in the catalogue card due to bad handwriting. Enquiry from the reference section of the library revealed that most of the users came for literature search from biomedical journals and since the same are arranged alphabetically, they bypass the catalogue and get the required journal from the concerned rack.

Searches to the Catalogue

Every catalogue search is a word-matching exercise in which the user tries to match some known clues (i.e. a name or title or subject heading) against the terms used in the catalogue with a view to gaining more associated information from the catalogue cards (i.e. various bibliographic details of a book). The success or failure of a catalogue search depends on the following factors.

(1) Whether desired materials are available in the library.

(2) The clues adopted by the catalogue user for making a search.

(3) The manner in which he applies the clues.

(4) The entries and associated information provided in the catalogue.

The information seeking behaviour of the users through the known-authors and titles is defined as known-item search. Subject approach needs no explanation. This analysis reveals that 71 (75%) users made searches through known clues and 24(25%) through subject approach. Further analysis of the known-item searches revealed that the number of users adopting author approach (53; 56%) was higher than that of users making the title approach, (18; 19%).

The mode of approach of the user community is shown in Table 1.

It is clear from Table 1 that the author approach predominates over all other approaches. This finding tallies with the highest per-

Table 1

Types of Search vs User Group
known-item searches

Sl. No.	User group	Author No.	Author %	Title No.	Title %	Total No.	Total %	Subject search No.	Subject search %	Total
1.	Research scholars	29	64	7	16	36	80	9	20	45
2.	Practitioners	11	31	10	28	21	59	15	41	36
3.	Teachers	5	100	-		5	100	-		5
4.	Postgraduates	3	75	1	25	4	100	-		4
5.	Undergraduates	3	100	-		3	100	-		3
6.	Non-medical professionals	2	100	-		2	100	-		2
	Total	53	56	18	19	71	75	24	25	95

centage of the author approach (62%) and very low percentage of title search (28.5%) reported by Lipetz. The low percentage of title approach is indicative of reluctance on the part of users, though title entries are provided for all the books. The use of subject approach is considerably higher in the case of practitioners and lower for research scholars. Lesser known-item searches are made by practitioners and comparatively higher by all the other groups. This finding is contradictory to the findings of ALA study and Michigan study 1967 according to which "The approaches taken to search the catalogue vary and are related to patrons' educational status, the frequency of known-item searches increases as educational level of the partron increases".

Performance of the Catalogue

As revealed by the various groups, 78 (82%) users were successful in searching the required material through the catalogue, while 17 (28%) of them failed in this. The failures may be due to the following reasons:

1. Searching the author part without knowing the author's full name.
2. Searching the titles without knowing the title fully.
3. Searching the subject heading without knowing the related headings.
4. Deficiency of the catalogue.
5. Absence of the desired documents.

The first three reasons may be collectively called users' fault.

Bibliographic Items Found Useful

Catalogue users seek bibliographic information, such as edition, publisher's name, place of publication and date of publication as follows:

Table 2

Proportion of users seeking bibliographic information

Sl. No.	Bibliographic element	No. of users finding the particular element useful	%
1	Edition	27	41
2	Publisher's name	12	18
3	Place of publication	11	17
4	Date of publication	5	8
5	Editor's name	10	16

The number of illustrations, number of pages, name of the series, cost of the book do not find a place in the catalogue. Interviews with the catalogue users revealed that they require information on these items very rarely.

SUGGESTIONS FROM THE USERS

The following suggestions were made by the users of the NML catalogue. These are given in order of preference; a few of them reflect deficiencies of the catalogue.

1. The catalogue should be kept upto date.
2. The journals which are available in the racks do not find a place in the serial catalogue.
3. Instructions on how to use the catalogue must find a place in the catalogue section.
4. There should be a relationship between the catalogue cards and location of racks for easy identification of books.

CONCLUSION

The survey conducted for a short period may not fully reflect the actual position with regard to the use of the catalogue of NML, since for a national focal point in health sciences more users need be taken into account for analysis. A survey covering a broader spectrum of users is necessary.

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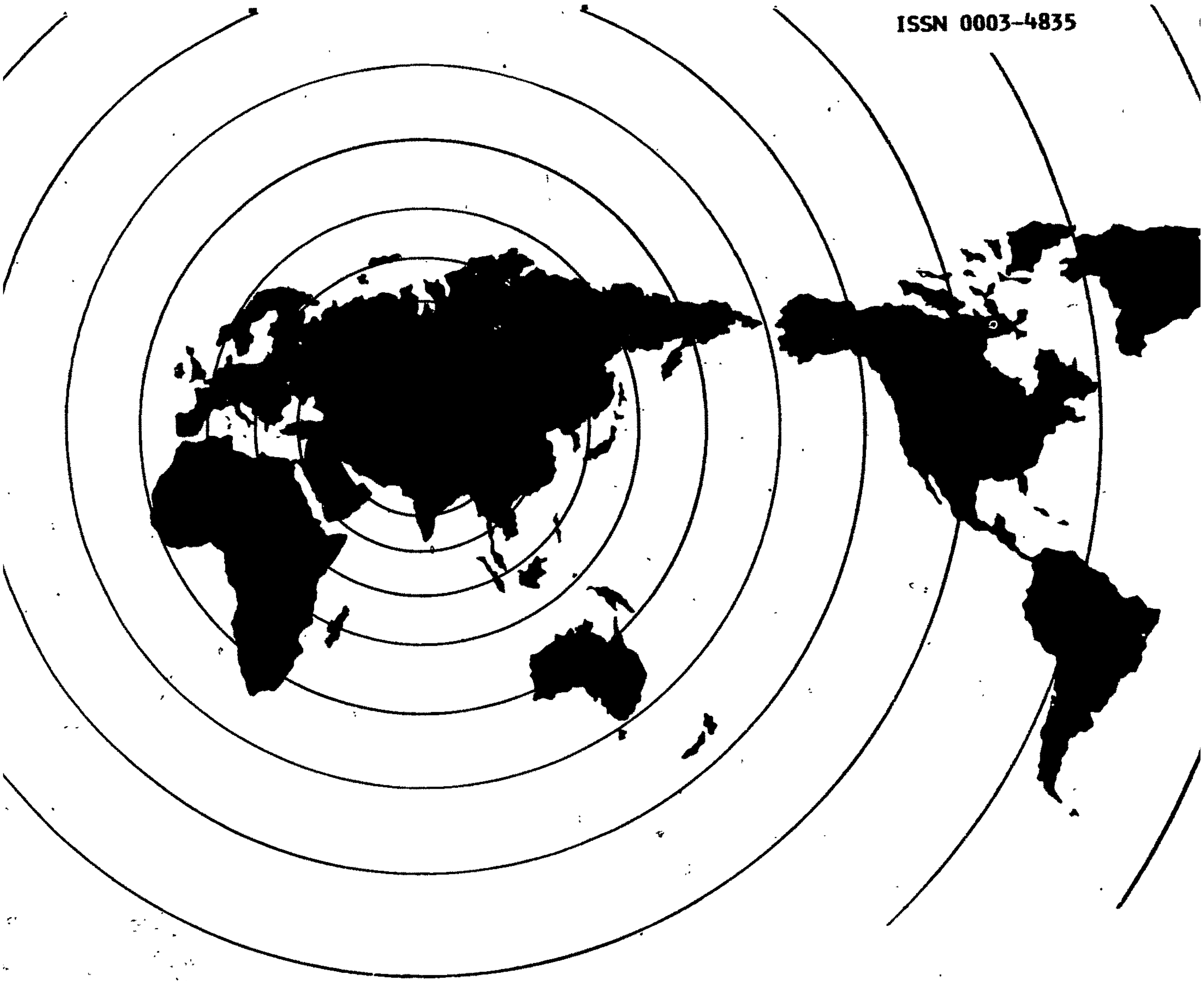

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USER STUDIES: STATE-OF-THE-ART

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The library contributes to the achievement of the institution's goals and objectives in teaching, research and services. The interest groups within the system play an important role in the library's efforts to carry out its functions.

User occupies a key place in the library and informaton system. The objectives of this review of the state-of-the-art of user studies are

- (i) to find out information-seeking attitude of users
- (ii) to indicate gaps in our knowledge of users
- (iii) to suggest areas of user attitudes for research and
- (iv) to outline techniques which might be useful for undertaking further research.

ATTITUDE OF USERS

For finding out information seeking attitudes of users the following questions may be asked:

- a) What do users require from the library in terms of type, quality and range of services to satisfy their needs?
- b) What does user do about his/her needs?
- c) How does the user select available resources?
- d) how does the user carry out a search for information?

Need to Study 'User'

There is a need to study user because:

- a) User attitudes are essential considerations in the design of the library services;
- b) Users have ways of doing things and these should be accommodated in the design of services; and
- c) Users have ways of doing things that should be changed.

WHY USER STUDIES

The students and faculty are users of the academic library, towards whom all services are directed. Their attitudes reflect the extent to which the efforts of the librarians are successful in developing the resources & services of the library to meet their needs.

The reasons for conducting various user studies are:

- (1) Identifying the actual strengths and weakness of library resources and services;
- (2) Identifying the levels and kinds of user needs;
- (3) Identifying faculty and student priorities for library resources and services;
- (4) Identifying the limitations or problems which seem to discourage the use of the library;
- (5) Identifying the level of involvement or participation of faculty and students in the library programme; and
- (6) Improving the organization and planning for library services at both the local and national levels.

FINDINGS OF USER STUDIES

Many studies were conducted in USA and UK. The findings of major studies are given in the following lines:

Line[1] conducted a survey of student attitudes to the university library at Southampton which revealed several problems and deficiencies and a number of changes in library policy and practice were instituted. The survey also revealed that women were more likely to use catalogues than man.

A follow-up study by Line & Tidmarsh[2] revealed some changes in student attitudes, some of which can fairly be attributed to the new policies. The two surveys are an excellent illustration of the concept of survey, policy evaluation, policy implementation and re-survey - a sequence which is rare in this field.

Urquhart & Schofield[3] conducted two major surveys to measure readers' failure at the shelves in three university libraries. The results of a failure survey will enable the librarian to establish priorities. The difference in rates of failure for different subject areas of the library may call for a reassessment of book purchasing policies. The third use of the survey is to have better understanding of reader problems and behavior.

Burns & Hasty[4] conducted a survey of user attitudes towards selected services offered by the Colorado State University libraries, and concluded that "most user studies have emphasized the descriptive rather than the analytical in their reporting and were conducted by practising librarians or information scientists with little or no attention to the adoption of rigorous methodology".

Lord[5] conducted a survey on research in user behaviour in university libraries with three objectives viz. to study user behaviour with the explanation of observed phenomena, the prediction of behaviour, and the control of behaviour by manipulation of conditions. The most important finding of this study on user behaviour is that it has yet to be demonstrated that the use of libraries has any definite influence on anything else.

Canarie[6] conducted a study on "attitudes of secondary school administrators towards school librarians and school library service" to assess the attitudes of secondary school administrators towards librarians' personal attributes the capability or aptitude of the librarian for fulfilling the role, and the effectiveness of library service. The findings of the study suggested that the attitudes of secondary school administrators towards school librarians and towards school library service are highly positive.

Kennedy[7] in her study tried to explore the attitudes of academic librarians towards older adult users of the library. It was found that age is not necessarily a debilitative factor with regard to learning and motivation to learn in older adults.

Churchlands & Nedlands[8] carried out surveys of student attitudes to their respective college libraries in Western Australia. Information was sought on student attitudes to the college library and attitude scores were recorded by relating students' actual feelings about the college library, to their concepts of the "ideal" library. Detailed analysis of the data has yet to be undertaken for each library.

Minner-Van-Neygen[9] conducted his study of students' attitudes towards the behavioural approach to library and information sciences: an experiment involving the group as an agent of change, and revealed that there is a significant correlation between sex, level of exposure to the behavioural sciences.

Olanlokum[10] reported a study conducted to determine the attitudes of the major interest groups in Nigerian universities on library policy, use and service specifically, the attitudes of the faculty, students and librarians on adequacy of resources, quality of library collections and library services. The findings strongly suggested more interaction with the patrons. Users needs should also be given greater attention.

Dhyani[11] conducted a study with a sample of 100 readers at Rajasthan University Library. The study emphasized that there should be well-trained librarian offering reference service to the readers. The need for library instruction to readers in Rajasthan University Library is also stressed. Preparation of a manual like known your library is suggested for the readers. The dissemination of latest information to the faculty is also suggested.

SCOPE FOR FURTHER RESEARCH

While a large number of studies of information needs have been carried out, results are difficult to compare directly owing to the lack of standardisation in methods.

We need to know more about the context in which information needs arise: this may involve studies of attitudes and environment surrounding members of the target group so that information seeking attitude may be better understood.

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RELATIONSHIP BETWEEN SEX DIFFERENCES IN LOCUS OF CONTROL AND JOB PERFORMANCE IN LIBRARY ORGANIZATIONS

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The present study examines empirically the relationship between sex and internal-external expectancy. It also studies the differences in the level of performance between internally and externally oriented male and female library employees. The results of inter-correlation suggest sex as a significant correlate of locus of control. Bivariate analysis reveals significant difference in the level of performance between internally oriented male and female subjects. No difference was observed in externally oriented males and females with regard to their level of performance.

People acquire "a generalized attitude, belief, or expectancy regarding the nature of the casual relationships between one's own behaviour and its consequences"[1], as a result of the environment in which their behavioural pattern has been conditioned. Some people may perceive themselves personally responsible for rewarding and punishing events (internals) versus those who may perceive themselves as pawns controlled by external forces (externals). According to the social learning theory, an individual's internal-external (I-E) expectancy refers to ".... the degree to which an individual believes that what happens to him is the result of luck, chance, fate, or forces beyond his control"[2].

There can be a number of causal antecedents of belief in internal-external expectancy. A large number of empirical studies reveal that, among other factors, sex differences influence an individual's belief regarding locus of control[3-7]. These researchers have attributed the difference in the internal-external expectancy, between male and female, to the cultural roles assigned to each sex. On the contrary, several studies have evidenced inconsistent relationship between sex differences and measures of locus of control.

Rotter[1] reports that sex differences appear to be minimal on the I-E scale. Reitz and Jewell[8] evidenced negative relationship between sex and locus of control. However, Feather[5, 6] showed that females earned significantly higher external scores than males. On the other hand, Crandall[4] revealed no relationship between perceived control and achievement behaviour for female subjects. In another report, Crandall[9] suggests that responsibility attribution was significantly related to most criteria for males and not for females. Chance[3], interestingly, reports a significant correlation between achievement behaviour among females. Among other researchers who have reported sex differences on I-E scales are McGhee and Crandall[10]; and Nowicki[7].

Women are entering the labour force in greater numbers. They are competing for jobs which previously had been reserved for men. Their entry into labour force is increasing interest in the study of sex difference in job orientation. The attitudes of men and women towards a job differ significantly[11-15]. These attitudinal differences have the potential of influencing job performance[13].

During the past two decades or so, a large number of women folk have started joining the library organizations. Their belief in internal and external expectancy and its relationship with individual effectiveness has not been studied. The present investigation attempts to study sex differences on I-E scale and their impact on job performance. Based on the studies cited above, it is hypothesized that:

I: there will be a significant correlation between sex and locus of control.

II: there will be a significant difference in the level of job performance between internally oriented male and female subjects, and

III: the externally oriented male and female subjects will not vary in their level of job performance.

METHOD

Subjects

The data for present investigation were collected from 318 respondents. The subject (N=318) comprised 199 (62.58%) males and 119 (37.42%) females. For performance appraisal, heads of divisions/sections were contacted.

Measures

Personal information blank was administered to obtain information about demographic factors. The I-E scale, designed by Pareek and Rao[16] was used. The instrument contains pairs of 20 items. There are two filler items which are not included in the scoring. The score ranges from 0 to 36. The scores above 18 suggest externality and scores below 18 suggest internality. Rotter's[1] questionnaire of locus of control was also administered to test content validity of I-E scale. The test and retest reliability ranged between 0.72 and 0.77. Performance appraisal questionnaire, developed by Bose[17] was also used. The instrument is a Likert-type multiple choice scale containing response categories: outstanding, good, average, below average and poor. The overall score ranged between 12 and 60. The test and retest reliability of the instrument ranged between 0.60 and 0.62.

Data Analysis

For testing the hypotheses, univariate, bivariate and multivariate statistical techniques were applied. Univeriate statistical technique was used to compute mean and standard deviations. The bivariate Student's 't' test was applied to find out the mean difference with regard to level of job performance between internally and externally oriented male and female subjects. The multivariate statistical analysis was applied to obtain the intercorrelation value between sex and locus of control.

RESULTS

The product-moment correlation between sex and locus of control, for the total sample (N=318), yielded a significant positive value r=0.169. The value of correlation obtained, statistically significant at $p < 0.01$ level of significance, suggests that sex is a significant correlate of locus of control. The findings under report are contrary to the observations made by Rotter[1], who suggested minimal sex differences on I-E scale. Reitz and Jewell[8] found negative relationship between sex and locus of control. In contrast, this study evidenced positive relationship between the two variables. The results obtained are in line with the findings of Feather[5, 6] and Nowicki[7], who also reported sex differences of I-E scale. The multivariate analysis thus supports hypothesis I.

The second hypothesis assumes significant difference in the level of performance between male and female subjects with internal control orientation. In order to test the hypothesis, Students 't' test was applied. The magnitude of mean difference (2.32) between internally oriented male (49.55) and female (47.23) is significant, but not very high. The computed 't' ratio (t=2.05) (Table 1) is significant at $p < 0.05$ level of significance.

Table 1

Values of Student's 't' ratio

Sex	**N**	**Mean**	**SD**	**SE**	**DF**	**'t' ratio**
Male	128	49.55	6.76	0.60	182	2.05*
Female	56	47.23	7.67	1.02		

*Significant at $p < 0.05$ level of significance

The bivariate analysis supports hypothesis II. The results suggest that internally oriented male subjects are still better performers compared to their female counterparts. The bivariate analysis supports the findings of Crandall[4]; Feather[5, 6]; McGhee and Crandall[10] and Nowicki[7]; who have also reported that males socred higher compared to females.

The third hypothesis does not assume any difference in the level of performance between externally oriented male and female subjects. The Student's 't' test (Table 2), reveals insignificant mean difference between externally oriented male (37.24) and female (37.46) subjects.

The computed 't' ratio ($t = -0.17$) is neither significant at $P < 0.01$ nor at $p < 0.05$ level of significance. The bivariate analysis suggests insignificant difference in the level of job performance between externally oriented male and female subjects. The computed 't' test supports hypothesis III.

DISCUSSION AND CONCLUSION

The results of the present study show that sex differences are causal antecedent of the belief in locus of control. Such differences may be on account of cultural roles assigned to each sex. Females are traditionally supposed to be passive, conformist, sensitive, delicate and concerned primarily with domestic trivia. Men, on the other hand, are traditionally supposed to be active, fearless, logical and tough. They should not display emotions and essentially must never cry. Males are taught that they are superior, and the females are taught that they are inferior. This ideology begins at birth. The boys play with cars and guns; girls play house with dolls. In all probability, the belief in internal and external expectancy, in the two sexes, is the product of environment in which their behavioural pattern has been conditioned.

The observed pattern of the results in Table 1 suggests differences in the level of performance between internally oriented male and female subjects. This difference in the level of performance may be attributed to the socialization process. Traditional sex role socialization, trains men to accept their role to work and provide support for the family. Men, are, thus, more responsive to a variety of job opportunities than females. The better performance of men may be attributed to the fact that they are encouraged to look at work ethic as an investment rather than a cost for the individual worker. The probable reason for difference in the level of performance in female subjects may be related to cultural values of the society[18], early childhood experiences[19]; and negative impact of demanding career on family life[20].

The results presented in Table 2 reveal insignificant difference in the level of performance between externally oriented male and female subjects. Their belief in external expectancy is perhaps on account of frivolous or ineffectual experiences gained by them. The probable reason for poor performance is lack of effort, ability, planning, organizing and controlling ability, self-reliance and initiative.

The present investigation has demonstrated that sex differences on I-E scale have an impact on job performance. Sex differences have also been reported to cause difference in awareness and motivation[21]; and attitude towards job[13]. Males and females view their jobs in different ways. A large body of research advo-

Table 2

Values of Student's 't' ratio

Sex	N	Mean	SD	SE	DF	't' ratio
Male	71	37.24	6.70	0.80	132	0.17
Female	63	37.46	8.12	1.02		

cates that sex differences are pervasive and that organizations should develop special training programmes and different career ladders for females in order to improve their performance[22]. However, there is consensus that these differences stem from cultural roles assigned to each sex. The sex-dichotomy may be biologically predisposed to tentative male and female orientation, but these predispositions can be modified by the socialization process. Today when fast and radical changes are taking place, the values and socialization norms are also changing. Women are entering the labour force in larger numbers. They are competing for the jobs which were previously reserved for men. As their abilities are getting recognized more widely, they will continually move into areas of greater responsibility. Their entry into work force and its impact on their job performance may redefine the sex role socialization in due course of time.

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A CONCEPTUAL MODEL FOR AGRICULTURAL KNOWLEDGE GENERATION AND TRANSFER

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A conceptual model for agricultural knowledge generation and transfer is presented. It is pointed out that the users play a vital role in an information storage and retrieval system.

INTRODUCTION

According to Kemp[1] knowledge is a system. Since every system grows, knowledge grows inevitably. Growth is a phenomenon inherent in the very nature of knowledge. Knowledge is a conceptual entity. Therefore, knowledge cannot be, visualized directly. Rather, it can be perceived only through its effects or through the medium of documents.

According to Neelameghan *et al* "Knowledge is generated at many points in world over – research institutions, universities and other academic institutions and industrial and commercial organisations. From the point of generation, knowledge diffuses within the organization and outside it through a variety of channels. A piece of knowledge thus communicated gets used, tested and applied. It may generate new knowledge. Thus, the wavefront of knowledge keeps advancing in different directions"[2]. Thus, knowledge grows while it is being used. Generation and regeneration is a never-ending process. Every growing system has a definite pattern of growth. Similarly, knowledge also has a definite pattern of growth. Modelling of the pattern of growth of a knowledge system needs to be based upon inherent concepts of that particular system. The objective of this paper is to draw a conceptual model for agricultural knowledge generation and transfer, primarily for the benefit of the users of agricultural knowledge.

CONCEPTUAL BASE

Knowledge is generated for use, primarily for social development. Knowledge is verified and tested through research. During the process of research, new knowledge is generated. The entire gamut of activity is a continuous never-ending phenomenon. The key factors in the knowledge system are generation, transfer and use. Generation is done by research; transfer is done by communication and dissemination; and use by assimilation of knowledge by human agency for the regeneration of knowledge. This appears to be a spiral system.

Agricultural knowledge has two aspects – scientific and technological. Thus, the generation of knowledge and its application go hand in hand. But agricultural knowledge has a specific character in contrast to other applied sciences and technologies – its orientation to problems. The process of solving the problems by research generates agricultural knowledge. Hence, agriculture is problem-oriented applied science and technology.

The knowledge generated by research flows from laboratory to land and vice-versa through the medium of extension education. This is known as operationalisation, which is the spectrum of activity by which research results are put into usable forms. Ramachandra and Stanely Madankumar [3] observed that three major elements involved in the creation, spread and use of agricultural knowledge are research, dissemination and use. These three elements together constitute the agricultural knowledge system. According to them, the process of information flow in agriculture is neither one way nor does it have a definite "beginning" or "end". Ideally, the flow of information between the componets includes forward linkages as well as feedback. Research results are important to the scientist who performs research. Research utilizes the existing information. Therefore, information transfer should be effected to both the laboratory and the land. Scientists in the laboratory utilize information to generate new information, whereas the farmer on the land makes use of the existing information to increase the production by overcoming the problems. Thus, the use of information and land provides an indication of the scope of the problems arising and it becomes a feedback to the laboratory scientist. The scientist resolves the problems by engaging himself in research. Therefore, land acts as the feedback system for supplying problems to the laboratory and these problems get solved through research. Agricultural information, therefore, gets transferred in the scientific channel and the extension channel.

PALMOUR'S MODEL

Palmour [4] describes a macromodel for scientific and technical information transfer with 11 key variables starting and ending with research in a circular path. Emphasis is on research which generates information by utilizing the existing information. The remaining 10 variables are composition, recording, reproduction, distribution, acquisition and storage, organization and control, identification and location, physical access and assimilation.

Palmour's model depicts research as the key factor in the knowledge generation system. The key variables in the system are so depicted that they are interlinked on a circular path so as to make research as the starter in the entire gamut of activities. Palmour's model clearly explains the characteristic features in the generation and transfer of scientific and technological information. Using the key variables given by Palmour, an attempt has been made here to build up a conceptual model for agricultural knowledge generation and transfer.

CONCEPTUAL MODEL FOR AGRICULTURAL KNOWLEDGE GENERATION AND TRANSFER

Scientific agriculture has two aspects: research and extension. Research generates agricultural knowledge and extension transfers the knowledge generated in the most adaptable form for use on land. The purpose of generating knowledge is to deliver technology which on transfer in the most adaptable form on land increases agricultural production. Problems are identified and technologies are developed by research for solving the problems and tested on the laboratories and transferred to land, where they are tried; again new problems are identified and new technologies are developed. Thus, there is a two-way channel of information flow between land and laboratory (Figure 1).

In Figure 1 four quadrants intercept the central point, that is, knowledge. Quadrant 1 is the area of authors who record the knowledge generated through research. The intercepting points here are generation and transmission. Quadrant II is the area of publishers and distributors who use the recorded knowledge for editing, printing, publishing and distributing. The intercepting points are transmission and acquisition. Quadrant III is the area of library and information scientists who use the published knowledge for storing, retrieving and supplying to scientists through a variety of information dissemination services. The intercepting points here are acquisition and supply. Quadrant IV is the area of scientists who use this knowledge for conducting research for the regeneration of knowledge. Again the cycle enters quadrant I and the regenerated knowledge is recorded by the authors. This again goes to publishers and distributors for transmission and again to library and information scientists for dissemination to

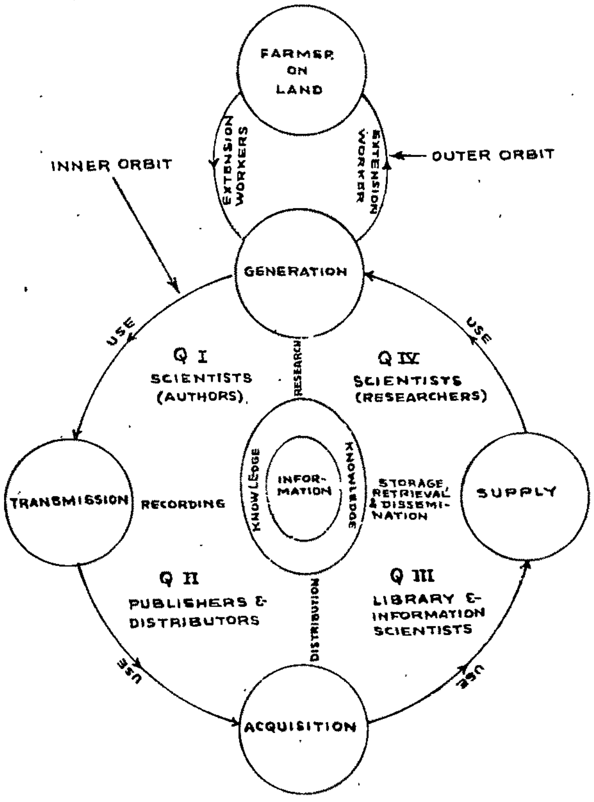

Fig.1: Conceptual model for agricultural knowledge generation and transfer.

scientists for conducting research. Thus, this phenomenon is an unending spiral.

Agricultural research at the point of generation gets feedback of problems through extension workers from farmers on land and sends back solutions through the same channel of extension workers; the farmers use the processed information in their fields to maximise agricultural production. This phenomenon exhibits the two-way information transfer from laboratory to land and vice versa. This is an extension phenomenon and has no direct role in the knowledge generation process. Therefore, it is shown as the outer orbit in the mode. It can be visualized from this model that information transfer takes place in different pathways with the involvement of different agencies. The common phenomenon is the use of information at every stage. The agencies involved are the users of the information at different locations. This makes it evident that users play a predominant role in the functioning of modern information storage and retrieval systems.

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PERIODICALS IN THE YEAR 2000 – A COST ANALYSIS

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Investigates the impact of hike in subscription rates, fluctuation of foreign currencies of periodicals and predicts the cost trend of periodicals on the basis of statistical technique at the end of this decade and the century.

INTRODUCTION

Information, a functional resource of this modern age, is widely generated and consumed by technologists, a most basic raw material of all, that can never be exhausted, becoming more important than ever before, even reorganize the media of communication and makes the present mass media both print and electronics wholly inadequate to cope with the communication.[1] Eruption of information explosion raises a doubt that no one can keep information up-to-date even in a narrow field. Lukasiewicz calls this phenomena as IGNORANCE EXPLOSION.[2,3] The rate of acceleration of this technological change becomes a perennial problem of this information age.

It has been estimated that in 1980 the world output of scientific and technical periodicals was around 55,000 separate titles,[4] and this number increases at a compound rate of 2% to 4% every year.[5] In India nearly 13,403 titles are received by 785 libraries including 3,816 American publications, 2,071 titles from United Kingdom and 1,892 Indian publications. The remaining 5,624 titles are received from 79 different countries. "To illustrate, it may be pointed out that as a single library, namely the British Library Lending Division is receiving about 40,000 serials in Science and Technology field whereas in India, all libraries taken together receive only 11,511 foreign titles"[6]. It is apparent that our country receives only 27% of the total outcome of the world and covers only 33% of British Library Lending Division. Most strikingly the hike in subscription rates is the main reason besides the conventional factors, for the low acquisition of periodicals by the Indian libraries. Further, subscribing to periodicals in future is also more doubtful.

OBJECTIVE

The purpose of this analysis is to assess the nature of changes in the subscription rates of periodicals during the years. More specifically this study is an attempt to present as silhouette the cost trend of the periodicals during the end of this decade and at the end of the century.

LIMITATIONS

1. Cost of primary periodicals alone taken up for the study
2. 110 periodicals only taken up for the study and the countrywise break up is as follows:

U.S.A.	45
U.K.	45
INDIA	20

3. Sample periodicals selected for study may be subject to huge increase in subscription rate or to a minimum
4. Annual subscription prices taken up for the study are paid by the M.I.T. library
5. Names of the journals are deliberately withheld to prevent undue influencing
6. Because of the data limitations, the results reported must be viewed as representative. Information on more periodicals is required in order to evaluate the robustness of these results.

METHODOLOGY

Periodicals, an important segment of technical information, aptly quoted as *Selective Information Filter* now-a-days become more expensive. The emerging cost turns out to be a turbulant one in the limited budget of a library; and also nonpluses the librarians in finalising the budget every year. A case study was built on two tiers; (i) trend based on country (ii) future trend on subscription rates, at the end of the decade and during the end of the century.

COST TREND BASED ON COUNTRY

An analysis has been made on the subscription rates of various occident periodicals i.e. U.S.A. & U.K. as majority of the periodicals received by the Indian libraries belong to these countries.

Average cost of periodicals originating from three countries viz. U.S.A., U.K. and India from the beginning of this decade to this date is given in Table 1. Cost of limited number of periodicals from each of these countries as mentioned above, has been analysed for this study for the past six years, i.e., from the year 1980 to 1985.

As can be observed from Table 1, subscription rates during the six year period under examination took gradual turn, as time progressed, in foreign periodicals, whereas Indian periodicals maintain same position.

Table 2 provides the incremental subscription ratio calculated in the simplest manner for the consecutive period. Further it gives a vivid picture that the subscription rates have

Table 1

Country		Subscription rates during 1980	1981	1982	1983	1984	1985
U.S.A.	$	3352.52	3996.18	4596.57	5407.44	6147.74	7013.94
U.K.	$	1433.86	1580.36	1695.61	1952.86	2197.86	2482.86
	£	1194.90	1463.05	1651.60	1820.50	1984.00	2168.10
India	Rs.	1431.00	1466.00	1471.00	1523.00	1523.00	1703.00

Table 2 : Percentage of increase in subscription rates

Country	Percentage of increase during the year 1980-81	1981-82	1982-83	1983-84	1984-85	Average % of increase in every year	% of increase between 80-85
U.S.A.	19.20	15.02	17.64	13.69	14.09	15.93	109.21
U.K.	15.78	9.98	12.73	10.83	11.22	12.11	76.93
India	2.45	0.34	3.54	-	11.82	3.63	19.01

Table 3 : Rate of increase in subscription

Country	1980	1981	1982	1983	1984	1985
U.K.	1.00	1.15	1.27	1.44	1.59	1.77
U.S.A.	1.00	1.19	1.37	1.61	1.83	2.09

Table 4: Cost trend of U.S. periodicals

S. NO.	C. NO.	SUBSCRIPTION RATES IN						% OF INCREASES DURING 1980-85	COST IN 1990	COST IN 2000
		1980	1981	1982	1983	1984	1985			
1	A01	102.00	122.00	134.00	174.00	192.00	202.00	98.04	312.23	509.60
2	A02	24.00	36.00	50.00	50.00	60.00	60.00	150.00	102.32	184.21
3	A03	40.00	46.00	46.00	53.00	58.00	58.00	45.00	79.24	120.71
4	A04	45.00	65.00	65.00	75.00	75.00	79.00	75.56	112.09	170.63
5	A05	24.00	32.00	26.00	39.00	65.00	135.00	462.50	194.69	374.84
6	A06	20.00	40.00	50.00	70.00	75.00	75.00	275.00	141.58	261.07
7	A07	59.00	67.00	74.00	80.00	88.00	92.00	55.93	127.50	198.51
8	A08	53.00	78.00	82.00	95.00	113.00	113.00	113.21	177.93	293.54
9	A09	52.00	66.00	87.00	92.00	103.00	129.00	148.08	195.16	336.13
10	A10	53.00	69.00	78.00	99.00	127.00	140.00	164.15	228.82	405.74
11	A11	66.00	76.00	88.00	110.00	118.00	140.00	112.12	211.05	361.33
12	A12	79.00	99.00	108.00	119.00	130.00	152.00	92.41	215.21	350.50
13	A13	77.00	86.00	88.00	100.00	108.00	120.00	55.84	159.96	247.75
14	A14	79.00	101.00	116.00	134.00	159.00	175.00	121.52	269.96	453.73
15	A15	38.00	44.00	50.00	58.00	68.00	72.00	89.47	110.05	190.35
16	A16	40.00	51.00	56.00	65.00	77.00	61.00	52.50	99.81	156.60
17	A17	53.00	65.00	75.00	85.00	100.00	150.00	183.02	215.06	377.45
18	A18	28.00	28.00	28.00	28.00	70.00	70.00	150.00	114.87	216.11
19	A19	40.00	40.00	55.00	55.00	65.00	65.00	62.50	96.77	157.39
20	A20	91.00	108.00	119.00	154.00	172.00	182.00	100.00	282.04	466.30
21	A21	46.00	54.00	61.00	81.00	89.00	94.00	104.35	150.10	260.70
22	A22	102.00	132.00	160.00	180.00	252.00	384.00	276.47	579.96	1059.75
23	A23	80.00	110.00	158.00	180.00	180.00	195.00	143.75	326.71	576.95
24	A24	22.00	22.00	35.00	35.00	35.00	35.00	59.09	55.85	102.98
25	A25	36.00	36.00	90.00	90.00	90.00	90.00	150.00	163.57	280.97
26	A26	46.00	54.00	64.00	81.00	89.00	94.00	104.35	149.09	253.62
27	A27	64.00	69.00	71.00	81.00	98.00	98.00	53.12	137.75	216.27
28	A28	30.00	32.00	36.00	48.00	54.00	60.00	100.00	92.37	158.57
29	A29	70.00	80.00	98.00	120.00	120.00	140.00	100.00	209.12	343.82
30	A30	30.00	30.00	30.00	40.00	52.80	53.00	76.67	81.79	143.32
31	A31	14.95	14.98	20.00	22.47	22.47	22.47	50.30	33.53	54.85
32	A32	8.60	8.60	8.60	14.00	14.00	14.00	62.79	21.81	36.28
33	A33	60.00	86.00	140.00	177.00	224.00	265.00	341.67	469.59	859.16
34	A34	22.00	27.00	27.00	27.00	33.00	33.00	50.00	48.66	98.63
35	A35	78.00	86.00	98.00	106.00	114.00	140.00	79.49	188.96	298.69
36	A36	30.00	30.00	30.00	50.00	50.00	50.00	66.67	79.34	135.37
37	A37	16.97	17.60	19.97	23.97	23.97	23.97	41.25	34.05	53.76
38	A38	40.00	40.00	49.00	67.00	75.50	89.50	123.75	138.74	238.19
39	A39	330.00	385.00	385.00	511.00	577.00	660.00	100.00	971.13	1597.93
40	A40	407.00	490.00	511.00	583.00	654.00	755.00	85.50	1059.97	1715.77
41	A41	418.00	484.00	550.00	621.00	693.00	795.00	90.19	1145.92	1877.43
42	A42	264.00	313.00	363.00	412.00	462.00	505.00	91.29	754.23	1259.61
43	A43	35.00	35.00	45.00	50.00	50.00	50.00	42.86	77.13	149.93
44	A44	19.00	21.00	24.00	24.00	24.00	24.00	26.32	30.78	45.48
45	A45	20.00	20.00	48.00	48.00	48.00	74.00	270.00	117.72	212.04
		3352.52	3996.18	4596.57	5407.44	6147.74	7013.94	109.21	10564.24	17862.63

Table 5: Cost trend of U.K. periodicals

S. NO.	C. NO.	SUBSCRIPTION RATES IN						% OF INCREASES DURING 1980-85	COST IN 1990	COST IN 2000
		1980	1981	1982	1983	1984	1985			
1	L01	19.75	23.75	26.35	28.00	29.75	31.85	61.27	43.45	64.54
2	L02	28.00	40.00	45.00	45.00	49.50	49.50	76.79	71.74	109.20
3	L03	$ 37.95	37.95	37.95	37.95	47.95	47.95	26.35	58.62	82.63
4	L04	24.00	24.00	35.00	38.00	40.00	40.00	66.67	61.39	97.76
5	L05	$ 40.00	50.00	56.25	75.00	100.00	105.00	162.50	175.47	308.27
6	L06	1.70	4.00	4.00	8.00	13.00	13.00	664.71	27.45	60.96
7	L07	$ 47.50	47.50	47.50	55.00	60.00	65.00	36.84	82.09	119.60
8	L08	45.00	53.00	58.00	64.00	69.00	73.00	62.22	101.67	155.68
9	L09	108.00	126.00	140.00	160.00	173.00	183.00	69.44	261.89	407.20
10	L10	20.00	25.00	28.00	32.00	35.00	38.00	90.00	57.68	101.79
11	L11	30.00	38.00	38.00	38.00	38.00	40.00	33.33	48.11	64.75
12	L12	$ 264.00	300.00	330.00	360.00	360.00	380.00	43.94	498.87	708.08
13	L13	82.00	95.00	100.00	100.00	100.00	109.00	32.93	132.00	187.99
14	L14	162.00	210.00	240.00	270.00	290.00	312.00	92.59	462.81	735.65
15	L15	27.00	40.00	43.00	48.00	52.00	60.00	122.22	91.96	167.71
16	L16	72.00	80.00	90.00	100.00	100.00	115.00	59.72	153.83	234.81
17	L17	50.00	60.00	67.00	75.00	75.00	95.00	90.00	129.93	209.48
18	L18	25.60	32.00	39.00	45.00	49.00	57.00	122.66	87.37	149.96
19	L19	40.00	48.00	49.50	60.00	70.00	75.00	87.50	110.85	181.98
20	L20	$ 13.94	13.94	15.94	15.94	15.94	15.94	14.35	19.58	29.40
21	L21	$ 14.97	15.97	17.97	27.97	27.97	27.97	86.84	45.63	75.62
22	L22	10.60	11.80	13.00	13.00	13.00	14.00	32.08	17.30	25.09
23	L23	$ 45.00	50.00	65.00	80.00	90.00	90.00	100.00	145.89	241.24
24	L24	30.00	30.00	39.50	42.00	45.50	45.50	51.67	66.64	107.45
25	L25	27.00	33.00	35.00	39.00	57.00	64.00	137.04	97.98	169.89
26	L26	27.50	37.50	43.50	50.00	55.00	55.00	100.00	87.06	144.45
27	L27	$ 187.00	210.00	240.00	275.00	275.00	300.00	60.43	415.96	629.70
28	L28	45.00	50.00	60.00	65.00	75.00	82.00	82.22	121.44	208.05
29	L29	12.00	15.00	15.00	17.00	19.00	19.00	58.33	27.62	47.35
30	L30	22.00	25.00	30.00	35.00	35.00	40.00	81.82	57.74	92.19
31	L31	25.00	30.00	35.00	40.00	45.00	55.00	120.00	80.89	136.24
32	L32	39.00	58.00	65.00	74.00	83.00	99.00	153.85	151.24	256.66
33	L33	$ 99.00	110.00	110.00	120.00	120.00	135.00	36.36	163.37	229.59
34	L34	$ 225.00	225.00	225.00	280.00	425.00	600.00	166.67	863.50	1534.52
35	L35	23.00	39.00	45.00	51.00	54.00	57.00	147.83	100.19	211.32
36	L36	9.75	12.00	13.25	14.00	14.75	25.25	158.97	34.51	66.04
37	L37	8.50	8.50	8.50	9.00	11.00	11.50	35.29	14.76	23.30
38	L38	$ 130.00	130.00	130.00	160.00	160.00	170.00	30.77	214.15	299.03
39	L39	36.00	40.00	50.00	50.00	55.00	55.00	52.78	78.26	121.80
40	L40	$ 37.50	60.00	60.00	66.00	66.00	66.00	76.00	94.88	142.13
41	L41	$ 292.00	330.00	360.00	400.00	450.00	480.00	64.38	668.06	1024.42
42	L42	70.00	85.00	85.00	99.50	115.00	125.00	78.57	181.17	309.17
43	L43	7.50	10.50	12.00	12.00	13.50	13.50	80.00	21.39	41.76
*44	L44	67.00	79.00	99.00	99.00	110.00	116.00	73.13	166.43	256.98
		2628.76	3043.41	3347.21	3773.36	4181.86	4650.96	76.93	6592.79	10571.46

**Two separate journals continued as single title from the year 1984 onwards* gone up by a minimum of 12% every year.

In the years since 1980 the percentage of subscription of the two major countries U.S.A. and U.K. that are selected for study has increased to 109.21% and 76.93% respectively.

TREND IN U.S. PERIODICALS

Cost of 45 periodicals taken up for study for the past six years i.e. from 1980-85 is given in Table 4. This table also provides the percentage of increase in subscription rates for individual periodicals during these years and it ranged from 26% to 462%. Average percentage of increase over two consecutive years, as shown in Table 2 is 16%. It is evident from Table 3 that the cost of U.S. periodicals doubles in five years.

TREND IN U.K. PERIODICALS

As shown above the cost trend of UK periodicals has also been analysed for the same period (Table 5) and the results are given below:

Percentage range of increase during the period 1980-85	14.35% to 664.71%
Average percentage of increase over two consecutive years (Table 2)	12%

The cost of UK periodicals doubles approximately once in seven years.

TREND ON TRANSLATION PERIODICALS

More than 63% of world scientific information is locked up in non-english journals.[7] Information presented in these journals also is useful for science and technology and the cost of these journals seems to be very high. There is a wide variation in subscription rates of these periodicals - nearly 14% increase in subscription rates every year. Subscription rates, already high, continue to rise every year.

Table 6: Cost trend of Indian periodicals

S. NO.	C. NO.	SUBSCRIPTION RATES IN 1980	1981	1982	1983	1984	1985	% OF INCREASES DURING 1980-85	COST IN 1990	COST IN 2000
1	I01	25.00	25.00	25.00	40.00	40.00	40.00	60.00	60.92	96.45
2	I02	15.00	15.00	15.00	15.00	15.00	15.00	0.00	15.47	18.27
3	I03	30.00	35.00	35.00	35.00	35.00	45.00	50.00	51.66	71.62
4	I04	96.00	96.00	96.00	96.00	96.00	96.00	0.00	96.26	97.84
5	I05	40.00	40.00	40.00	40.00	40.00	40.00	0.00	40.02	40.15
6	I06	25.00	25.00	25.00	25.00	25.00	35.00	40.00	37.19	50.36
7	I07	120.00	120.00	120.00	120.00	120.00	120.00	0.00	120.17	121.21
8	I08	100.00	100.00	100.00	100.00	100.00	100.00	0.00	100.01	100.10
9	I09	120.00	120.00	120.00	120.00	120.00	180.00	50.00	193.16	272.11
10	I10	90.00	90.00	90.00	90.00	90.00	120.00	33.33	127.62	173.32
11	I11	10.00	10.00	10.00	10.00	10.00	10.00	0.00	10.60	14.21
12	I12	100.00	100.00	100.00	100.00	100.00	100.00	0.00	100.05	100.33
13	I13	60.00	90.00	90.00	100.00	100.00	120.00	100.00	164.92	254.41
14	I14	60.00	60.00	60.00	60.00	60.00	100.00	66.67	109.95	169.65
15	I15	40.00	40.00	40.00	40.00	40.00	40.00	0.00	40.79	45.50
16	I16	160.00	160.00	160.00	160.00	160.00	160.00	0.00	160.06	160.43
17	I17	25.00	25.00	25.00	42.00	42.00	42.00	68.00	65.72	106.01
18	I18	200.00	200.00	200.00	200.00	200.00	200.00	0.00	200.53	203.71
19	I19	90.00	90.00	90.00	90.00	90.00	100.00	11.11	102.23	115.64
20	I20	25.00	25.00	30.00	40.00	40.00	40.00	60.00	60.88	96.15
		1431.00	1466.00	1471.00	1523.00	1523.00	1703.00	19.01	1858.21	2307.47

Table 7: Subscription rates of translation periodicals

(in Rupees)

S. No.	Subscription rates during						% of increase between	% of increase between
	1980	1981	1982	1983	1984	1985	1980-85	1984-85
1	330	335	385	511	577	660	100.00	14.38
2	407	490	511	583	654	755	85.50	15.44
3	418	484	550	621	693	795	90.19	14.72
4.	264	313	363	412	462	505	91.29	9.31
					Average			53.85
								4
						= 13.46		

FUTURE TREND

Predicting the cost of periodicals is important not only for meeting the cost but in formulating methods in acquiring more information without duplication within a budget limitation. Keeping this in view, cost of the periodicals at the end of the decade and for the year 2000 has been predicted.

METHODOLOGY

Numerous techniques have been developed by the statisticians in analysing the trend of the future. Algebraic method, based on the principle of least square provides an equation of the trend which may be a straight line, parabola or exponential curve, or a general curve and the trend line can be fitted accordingly.

Normally, cost factor always, lies in the order of increasing function. Taking this factor into account "Straight line trend method" has been adopted in order to find out the cost of periodicals at the end of the decade and for the year 2000.

Straight line trend method has an equation of the type $Y = a + bx$ where Y represents the estimated values of the trend, x represents the deviation in some convenient period. The constant 'a' refers to the Y intercept, i.e. it is the distance between the origin and the point, where the trend line cuts the Y axis. The constant 'b' refers to the slope of the line which indicates the change in Y for each unit change in X.

The two unknown constants 'a' and 'b' in the equation are obtained by solving two normal equations.

$$Na + b\Sigma X = \Sigma Y$$

$$a\Sigma X + b\Sigma X^2 = \Sigma XY$$

Example

Cost of the journal A01 for the year 1990 & 2000

X	Y	X X-A	X^2	XY
1980	102	-2	4	-204
1981	122	-1	1	-122
1982	134	0	0	0
1983	174	1	1	174
1984	192	2	4	384
1985	202	3	9	606
	946	3	19	838

$N = 6 \quad \Sigma X = 3 \quad \Sigma X^2 = 19 \quad \Sigma XY = 838$

$\Sigma Y = 946$

$$Na + b\Sigma X = \Sigma Y \qquad 6a + 3b = 946 \;........\; (1)$$

$$a\Sigma X + b\Sigma X^2 = \Sigma XY \qquad 3a + 19\,b = 838 \;.....\; (2)$$

By solving the equation (1) & (2) $a = 146.2$, $b = 20.8$

Hence the equation of trend line is

$$Y = 146.2 + 20.8\ X$$

In this equation, the year for which the trend value is to be calculated, may be substituted for X. In this study the value of X is 1990 and 2000. Since the arbitatory year has been assumed for easy computation, the value of X in this study is 1990-1982 = 8 and 2000-1982 = 18 (A=Arbitatory year = 1982).

Hence the value for the year 1990 is

$$Y = 146.2 + 20.8 \times 8$$

$$= 146.2 + 166.4 \doteq 312.6$$

and the value for the year 2000 is

$$Y = 146.2 + 20.8 \times 18$$

$$146.2 + 374.4 = 520.6$$

In order to obtain accuracy and for easy computation the data are fed into PDP 11S60 computer installed in this institute using the computer program (Annexure I). The cost of the periodicals thus predicted for the year 1990 and 2000 has been tabulated (Table 4,5 and 6) for the respective countries.

Merits

1. It is a scientific method and does not have different results.
2. Since it is based on the algebraic method of calculating the trend, it is free from bias; i.e. subjectivity does not enter into it.
3. Because the trend values are expected generally by straight line it can be extended without much difficulty and the forecasted values are reasonably trustworthy.
4. The trend values for all the items - even the intermediate ones or the future ones - can be obtained.

Demerits

1. Any estimate by this method is based on trend values and does not take into consideration seasonal and other variations.
2. It is a tedious method and involves more calculations.[8]

FLUCTUATION IN FOREIGN CURRENCIES

Volatile nature of the foreign currencies in the international market plays a substantial role in budgeting of libraries.. Hence conversion rates of foreign currencies at the time of remittance of subscription every year has been given (Table 8).

In order to estimate actual increase in subscription rates of foreign periodicals in

Table 8 : Conversion rates of foreign currencies

Currency	**Conversion rates during** (in Rupees)						**% of increase/ decrease**
	1980	**1981**	**1982**	**1983**	**1984**	**1985**	
$	8.50	8.20	9.60	10.10	10.50	12.80	+ 56.10
£	18.40	19.00	18.10	16.90	16.30	15.30	- 19.47

Table 9

S. No.	C No.	Subscription rates in						% of increases during 1980-85	Cost in 1990	Cost in 2000
		1980	1981	1982	1983	1984	1985			
1	USA	28496.42	32768.68	44127.08	54615.14	64551.27	89778.43	215.05	139178.11	247663.86
2	UK	34173.97	40756.90	46171.82	50490.34	55416.73	64952.54	90.06	92654.32	154427.09
3	INDIA	1431.00	1466.00	1471.00	1523.00	1523.00	1703.00	19.01	2665.56	7958.94
	TOTAL	64101.39	74991.58	91769.90	106628.48	121491.00	156433.97	144.04	234498.00	410049.91

Indian currency, the rates mentioned in Table 3 have been converted into Indian currency by respective conversion rate prevalent during the period (Table 9).

According to Indian currency the rates of U.S. periodicals has risen to 215% during the year 1980-85 and U.K. periodicals to 90% in spite of decrease in conversion rates. Average yearly consumption rises by 26% in U.S. periodicals and 10% in U.K. periodicals. Total percentage of increase of these two countries during the year 1980-85 is 147% and yearly consumption is 18%. Within a span of one year i.e. 1984-85, the percentage of increase rises to 29%. In other words every library has to set apart nearly 30% of previous year's subscription amount, in their budget every year to meet the subscription increases, fluctuations in foreign currencies.

COST OF THE PERIODICALS IN THE YEAR 2000

"Will there be periodicals in the year 2000? If so, will there be printed form as we have today?" are the questions raised by specialists in libraries. But the study has been extended to 2000 with the presumption that the periodicals will be certainly around for atleast the next several decades. Accordingly the cost of the periodicals in the year 2000 will be 160% more than the subscription rates during the year 1985. In other words the libraries will have to pay, in the year 2000, a subscription which will be around 3 times more than the subscription in the year 1985.

CONCLUSION

Rapid increase in subscription rates, already keeps the periodicals beyond the financial means of the individual subscriber. Budgetary austerity in libraries has already created a privation and also often plagued the librarian. Library budget is pruned often due to shortage of funds. Inadequate attention is usually paid to the needs of the libraries. At this stage there raises the doubt *can libraries subscribe periodicals in future?.[9]*.

As a suggestive measure in order to save on cost, the libraries in the same region have to take care to rationalize the periodicals subscribed. Librarians may discuss, examine and find out ways and means.

1 to avoid duplication within the same region

2. to communicate contents pages of important periodicals among libraries and

3. to loan to other libraries the periodicals of their interest.

Further, days are not far though not in near future, for the replacement of this conventional printed media. Probable replacement of this media would be microfiche form which finds intrusion already in primary communicating media. Most of the periodicals as mentioned, are now made available in microfiche form at the same cost as that of printed media. As a suggestive measure the libraries can acquire microfiche form. It requires only initial investment, which solves some of the problems like space, binding cost, furniture cost, maintenance cost, all of which naturally form more than 20% of the library budget every year. This amount can be earmarked to meet the increase in subscription of the periodicals. The suggested measure can meet ever rising subscription rates in a limited budget without creating chaotic conditions.

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ANNEXURE - I

PROGRAMME

```
      DIMENSION X(6),Y(6),CODE(3),S(6)
      OPEN(UNIT=2,TYPE='NEW',NAME='US.OUT')
      OPEN(UNIT=1,TYPE='OLD',NAME='US.DAT')
      WRITE(2,30)
      WRITE(2,44)
      WRITE(2,31)
      WRITE(2,44)
      L=1
      READ(1,*)N
      READ(1,*) (X(I),I=1,N)
100   READ(1,10,END=200) (CODE(I),I=1,3)
      READ(1,*,END=200) (Y(I),I=1,N)
      DO 15 J=1,N
      S(J)=S(J)+Y(J)
15    CONTINUE
      SUMX=0
      SUMY=0
      SUMXY=0
      SUMX2=0
      N2=(N+1)/2
```

```
          DO 20 K=1,N
          YK=Y(K)
          XK=X(K)-X(N2)
          SUMX=SUMX+XK
          SUMY=SUMY+YK
          SUMXY=SUMXY+XK*YK
          SUMX2=SUMX2+XK*XK
 20       CONTINUE
          A=(SUMY-B*SUMX)/N
          B=(SUMXY-A*SUMX)/SUMX2
          X3=A+B*8
          Y3=A+B*18
          SX3=SX3+X3
          SY3=SY3+Y3
          P=Y(6)-Y(1)
          PER=(P/Y(1))*100
          WRITE(2,40) L,(CODE(I),I=1,3),(Y(J),J=1,N),PER,X3,Y3
          L=L+1
          GO TO 100
  200     Q=S(N)-S(1)
          QER=(Q/S(1))*100.
          WRITE(2,42)
          WRITE(2,43) (S(I),I=1,N),QER,SX3,SY3
          WRITE(2,44)
          CLOSE(UNIT=1)
          CLOSE(UNIT=2)
 10       FORMAT(3A1)
 40       FORMAT(1X,I3,2X,3A1,2X,9F9.2)
 42       FORMAT(11X,'---------------------------------------
       1---------------------------------------------')
 44       FORMAT(1X,'--------------------------------------------------
       1--------------------------------------------')
 43       FORMAT(11X,9F9.2)
 30       FORMAT(32X,'COST TREND OF U.S. PERIODICALS')
 31       FORMAT(27X,'SUBSCRIPTION RATES IN',19X,'% OF',/,2X,'S.',2X,'C.',
       13X,'------------------------------------------------------',2X,
       2'INCREASES',2X,'COST',5X,'COST',/,2X,'NO.',1X,'NO.',7X,'1980',5X,
       3'1981',5X,'1982',5X,'1983',5X,'1984',5X,'1985',3X,'DURING',5X,
       4'IN',7X,'IN',/,67X,'1980-85',4X,'1990',5X,'2000')
          STOP
          END
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NATIONAL BIAS ON THE CHOICE OF JOURNALS: A STUDY ON AGRICULTURAL ECONOMICS FROM AMERICAN AND INDIAN POINT OF VIEW

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Journal rankings produced from the citations of one or more host journals of whatever importance and popularity in the field, are prone to be biased towards the nationality of their authors. Based on the above assumption attempts have been made to determine the amount of such biasness by authors in the field of agricultural economics by considering the citations produced by two standard and well-established journals in the field. Results showed that the literature of agricultural economics was highly concentrated to a very few journals. One-fifth of the total citations produced by the host journals were self-cited and also revealed a great national bias in the choice of journals by authors. It is suggested that to make the journal ranking studies relevant to practical librarianship certain other methods are to be evolved, rather than one practiced at present.

INTRODUCTION

Journal ranking studies are usually made to help in the selection of journals and in assessing the importance of one or more journals in a particular subject field. When authors borrow ideas from contributions of other authors, they usually provide the name of the host journals, which contain those contributions, as citations to their own contributions. Analysis of the name of the cited journals would clearly indicate the prominence of one or more journals over others. The prominent ones could be taken as more important ones in the authors' field of interest. In other words, if the names of the cited journals produced from a standard host journal in a particular field are arranged in order of their frequencies of appearance, the top most names could be taken as the most choicable ones which are preferred by the authors in that field. However, Line[2] has opined that there are good theoretical reasons for believing that these may not be representative of all references and bound to have biases towards the language and country of publication of source journals, especially in the subject groups of social sciences. The intention of the present paper is to find out how much bias is involved in the choice of journals by authors in the field of agricultural economics through the citations they have provided in two standard, well-established journals in the field, one published from America and the other from India.

MATERIALS AND METHODS

The name of the cited journals appended to the articles in *American Journal of Agricultural Economics* (abbreviated as AJAE) and *Indian Journal of Agricultural Economics* (abbreviated as IJAE) published from 1970 to 1980 were recorded on slips and the names were arranged according to the number of citations they received. The rank lists were prepared separately for AJAE and IJAE. The nationality of the cited journals were determined for further analysis.

OBSERVATIONS AND DISCUSSIONS

Nationality of the contributors

Analysis of the nationality of the contributors to both the journals from 1970 to 1980 showed that 32 contributions out of 296 (10.8%) in AJAE and 30 contributions out of 192 (15.6%) in IJAE were written by authors of foreign origin. This indicated that the major portions of the contributions in both the journals were written by authors belonging to their own nationality i.e. Americans in AJAE and Indians in IJAE. This made the following observation more authentic: the journal ranking list produced from AJAE reflected the American authors' preferences whereas that of IJAE reflected the Indian authors' preferences.

Nature of rank lists

Altogether 3150 citations were analysed which included 2209 citations from AJAE and 941 citations from IJAE. The rank list for AJAE consisted of 306 journals whereas that of IJEA consisted of 142 journals. In both the cases 2 journals were sufficient to cover 30% and 5 journals to cover 50% of the total citations, in other 50% of the total citations. The other 50% of citations were covered by 301 journals in AJAE and 137 journals in IJAE. This indicated that the number of core journals which contributed to the total citations in agricultural economics were similar in both the cases. But the rest of the journals which contributed to the citations showed that the choices of American authors were much more wider than those of Indian authors.

Names and nationality of core journals

Tables 1 and 2 provide the names of core journals with their frequencies of occurrence and nationality in the field of agricultural economics from American and Indian point of view. All the five ranked journals preferred by American authors were of American origin whereas of those by Indian authors, the first two were of Indian and the next two were of American origin. The 4th position in the latter case was, however, shared by journals of Indian, British and American origin. Almost one-fifth of the total citations were self-citations in both the cases.

The choice of the journals indicated a strong national bias. *American Journal of Agricultural Economics* featured in the third position in IJAE whereas the *Indian Journal of Agricultural Economics* contributed only 6 citations of AJAE and featured in the 25th position in its rank list. Among the core journals, *Journal of Farm Economics, Econometrica* and *American Economic Review* featured in both the lists, which indicated their popularity among the American as well as Indian authors. Interestingly, *Economic and Political Weekly* which was highly preferred by Indian authors, finds an incredibly low position in the rank list of AJAE with only two citations. The nationality of the cited journals having more than one citation in both the rank lists were determined to find out the possible contributions of different nations towards the literature of agricultural economics. Those

Table 1: Core journals from American point of view

S. No.	Name of Journal	Frequency of Occurrence	Percentage of Articles Covered	Nationality
1.	American Journal of Agricultural Economics	478	21.6	US
2.	Journal of Farm Economics	224	12.4	US
3.	Econometrica	164	7.4	US
4.	American Economic Review	145	6.5	US
5.	Journal of Political Economy	112	5.1	US

Table 2: Core Journals from Indian Viewpoint

S. No	Name of the Journal	Frequency of Occurence	Percentage of Articles Covered	Nationality
1.	Indian Journal of Agricultural Economics	182	19.3	India
2.	Economic and Political Weekly	181	19.2	India
3.	Journal of Farm Economics	50	5.3	US
4.	American Journal of Agricultural Economics	50	5.3	US
5.	Agricultural Situation in India	23	2.4	India
6.	Economic Journal	23	2.4	UK
7.	Econometrica	23	2.4	US
8.	American Economic Review	23	2.4	US

journals which are responsible for only one citation each were considered less important and were not included in the percentage calculations. The nationality of the cited journals showed that the country which topped the list was US for American authors and India for Indian authors (Table 3).

Apart from the above countries, seven countries in both the cases contributed a single journal. They were Ghana, Thailand, Italy, Poland, Sweden, Phillipines and Hongkong for American side; and Canada, Iran, Italy, Indonesia, Switzerland, Phillipines and Japan for Indian side.

CONCLUSIONS

The foregoing discussions revealed certain interesting trends regarding the journal ranking studies in agricultural economics. The two journals, considered here are the dominent ones in their respective countries of origin. They are responsible for almost one-fifth of the total citations. The distribution of citations showed that the literature of agriculural economics is highly concentrated to very few journals. The number of core journals in the field is very small and just five journals are responsible for 50% of the total citations. The study revealed a great national bias in the choice of journals by American as well as Indian authors in the field.

It can be suggested that to make the journal ranking studies free from any amount of national bias certain other methods of studies are to be evolved; otherwise the citations produced from a single standard journal or few standard ones would not clearly indicate the importance of one or more cited journals within the discipline, thus making these studies irrelevant to practical librarianship, especially in the subject fields of social sciences [1, 3].

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Table 3: Nationality of the cited journals having more than one citation

American angle			Indian angle		
Nationality	No of Journals	Percentage	Nationality	No of Journals	Percentage
US	92	30.1	India	32	22.5
UK	7	2.3	US	25	17.6
India	6	1.9	UK	9	6.3
Australia	5	1.6			
Netherlands	4	1.3			
Canada	4	1.3			
New Zealand	2	0.6			
Pakistan	2	0.6			

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APPENDIX - 1

Most frequently cited journals in Agricultural Economics by American authors

S.No.	Name of the Journal	Frequency of occurrence	Nationality
1.	American Journal of Agricultural Economics	478	US
2.	Journal of Farm Economics	274	US
3.	Econometrica	164	US
4.	American Economic Review	145	US
5.	Journal of Political Economy	112	US
6.	Review of Economics and Statistics	44	Netherlands
7.	Quarterly Journal of Economics	44	US
8.	Management Science	39	US
9.	Review of Economic Studies	34	US
10.	Agricultural Economics Research	33	US
11.	American Statistical Association Journal	32	US
12.	Canadian Journal of Agricultural Economics	26	Canada
13.	Economic Journal	25	UK
14.	International Economic Review	24	US
15.	Food Research Institution Studies in Agricultural Economics, Trade and Development	23	US
16.	Journal of Agricultural Economics	22	UK
17.	Water Resources Research	15	US
18.	Australian Journal of Agricultural Economics	14	Australia
19.	Journal of Animal Science	14	US
20.	Royal Statistical Society Journal, C. Applied Statistics	13	UK
21.	Journal of Economic Literature	13	US
22.	Journal of Finance	12	US
23.	Southern Economic Journal	11	US
24.	Land Economics	11	US
25.	Journal of Environmental Economics and Management	11	US
26.	Agronomy Journal	11	US

APPENDIX - 2

Most frequently cited journals in Agricultural Economics by Indian authors

S.No.	Name of the Journal	Frequency of occurrence	Nationality
1.	Indian Journal of Agricultural Economics	182	India
2.	Economic and Political Weekly	181	India
3.	Journal of Farm Economics	50	US
4.	American Journal of Agricultural Economics	50	US
5.	Agricultural Situation in India	23	India
6.	Economic Journal	23	UK
7.	Econometrica	23	US
8.	American Economic Review	23	US
9.	Economic Weekly	16	India
10.	Indian Economic Review	14	India
11.	Review of Economics and Statistics	13	Netherlands
12.	Food Research Institution Studies in Agricultural Economics, Trade and Development	12	US
13.	Economic Development and Cultural Change	11	US
14.	Reserve Bank of India Bulletin	11	India
15.	Journal of Political Economy	10	US
16.	Journal of Agricultural Economics	10	UK
17.	Artha Vigyan	9	India
18.	American Statistical Association Journal	9	US
19.	Journal of the Indian Society of Agricultural Statistics	7	India
20.	Indian Journal of Meteorology and Geophysics	7	India
21.	Quarterly Journal of Economics	7	US
22.	Foreign Affairs	6	US
23.	Water Resources Research	6	US
24.	Yojana	6	India
25.	Pakistan Development Review	6	Pakistan

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FOREIGN SCIENTISTS' CONTRIBUTIONS TO INDIAN SCIENTIFIC PERIODICALS: A SAMPLE STUDY OF INDIAN SCIENCE ABSTRACTS

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Analyses the sample data from (July 1982 - June 1984) the issues of Indian Science Abstracts in respect of foreign scientists' contributions published in Indian periodicals and their subject scatter. Identifies core Indian periodicals in science and technology and makes out a case for improving the quality and editorial standard of Indian periodicals for attracting more foreign contributions.

INTRODUCTION

Periodicals are regarded as an important communication channel for the dissemination of research in information and are indispensable for scientists engaged in research and development and/or teaching activities. It has been estimated that about 55,000 scientific periodicals are currently being published in the world [1], the number of Indian scientific periodicals has been estimated at about 2,000. *Indian Science Abstracts (ISA)* run by INSDOC, until recently a monthly abstracting service*, covers around 600 Indian periodicals. Out of a total of 1593 Indian Scientific periodicals listed in the *Directory of Indian Scientific periodicals* [2], only 26 are included for coverage in *Science Citation Index* [3], which is an international indexing service for science covering over 2,700 periodicals, as per the criteria of latter's usefulness in furthering scientific knowledge and their publication punctuality. A word about information generation, gathering and its publishing in the modern context seems pertinent here. The former has invariably been affected by an increasing trend for 'protectionism' due to world politics among nations, with the result that scientists are obliged to publish in periodicals originating in their respective countries. This is time of both socialist and capitalist blocks. A study of publication trends [4] has, however, shown a significant cross-country publishing activity. In this context, a review of the quality of publications has shown that the 'ignorance explosion' among the developing countries is mainly due to latter's emphasis on quantity rather than quality in the process of information gathering.

With the above facts in view, it was decided to take up the present study with the following main objectives:

a) To obtain an overall perspective of contributions of foreign scientists in Indian periodicals.

b) To identify core Indian periodicals in various scientific disciplines publishing foreign contributions (Appendix 1).

c) To identify scientific disciplines in which majority of foreign contributions are published in Indian periodicals.

d) To identify the subject disciplines/subdisciplines in which more new journals could be started.

e) To ascertain any possible relationship between foreign scientists' contributions in Indian periodicals and the quality/impact of scientific literature output and scope for improvement of quality.

SCIENTIFIC LITERATURE : INTERNATIONAL OUTLOOK

Every scientist is motivated by the usage for quick announcement and speedy communication of his research work with the aim of establishing or maintaining intellectual property rights. The most effective media for scientific

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**Since Jan. 1985, ISA is being published as semimonthly.*

communications are the journals and conference and seminar proceedings. In developing countries, the media for communication are not as highly developed as in some developed countries and this accounts for a major portion of research output being published in the journals of advanced countries. Since Scientific literature is largely international, one can make reasonable international comparisons of publication activity. It is observed that scientists and research workers in advanced countries tend to publish their scientific works in their own countries due to cultural or language bias against this, scientists in developing countries have a strong tendency to publish their contributions in reputed journals in developed countries, so that their work may attract the attention of scientists the world over. Since most of the scientists are concerned with only a few journals of their subject interest, they develop a bias against other journals emanating from other countries. For this reason, scientists from English speaking countries have a tendency to publish mostly in journals from USA and UK which are in English language.

In the case of India, Mehrotra and Lancaster [6] observed from the coverage of SCI data base that 58% of Indian research results are being published in periodicals of other countries, mainly USA, UK, Germany etc.

A study by Rangarajan and Gupta [7] based on the coverage in *Physics Abstracts*, revealed that more than 50% of articles by Indian authors in nuclear physics and other branches of physics were being published in foreign periodicals. A generous estimate of India's contribution to the total world output of literature in science, technology, medicine and agriculture cannot be more than 3% and this includes contributions in both Indian and foreign journals [8].

ISA AS A SOURCE FOR THE STUDY

Indian Science Abstracts (ISA) was started by INSDOC in 1965 with the objective of projecting a national abstracting service having adequate coverage of the contribution of Indian and foreign scientists in Indian periodicals and to act as a feeder service to the international abstracting services. It was also intended to serve as a comprehensive inventory of the scientific contributions by Indian scientists, including short communications, review and informative articles published in scientific and technical periodicals, proceedings of conferences and symposia, monographs, theses from various Indian universities. Indian standards and patents are also covered. Each monthly issue has about 2,000 entries. As a national abstracting service for the Indian scientific literature ISA claims to make a comprehensive coverage of the core Indian Periodicals publishing the contributions of both Indian and foreign scientists and therefore serves as an excellent source of study of the contributions of foreign scientists to the Indian periodical literature.

METHODOLOGY

In order to collect data on foreign authors' contributions in Indian periodicals, all issues of ISA from July 1982 to June 1984 viz. Vol. 18(7) to Vol. 20(6) were scanned entry wise for the purpose of identifying such contributions, each entry was judged on basis of the author's Institutions/organisation and the country of origin. In the case of entries where the author's address was missing in the bibliographic details of the entry, the approach adopted was to go in for ascertaining the same from the primary periodical in which the article by a foreign author appeared. The data were collected on 5 x 3 cards representing the bibliographical information about the nature of the primary publication, full address of the author, year of publication and subject headings. A total of 1,595 entries represented foreign scientists' contributions out of a total of 29,554 entries scanned for periodical articles.

ANALYSIS AND INTERPRETATION OF THE DATA

An analysis of 1,595 foreign research papers found to have been published in Indian scientific periodicals was done for subject scatter, countrywise scatter in different subjects and overall ranking of scientific periodicals.

Data in Table 1 covers the 1,595 papers utilised by foreign scientists in 197 Indian periodicals and 17 proceedings of conferences, seminars, etc. These contributions originated from 69 countries.

As seen from Table 1 maximum contributions (viz. 289 papers) in 21 Indian periodicals were received in chemistry, crystallography, mineralogy group of subjects followed by mathematics (231 papers) in 18 periodicals, physics & mechanics (209 papers) in 32 periodicals, medical & Health sciences (183 papers) in 53 periodicals and biology, anthropology (115 papers) in 29 Indian periodicals. It is interesting to note that the maximum number of countries (41) from where foreign authors contributed to the Indian periodicals was in mathematics. This was followed by medical and health sciences (40 countries) engineering & technology (34 countries), biology, anthropology (33 countries) physics & mechanics (32 countries) and chemistry, crystallography, mineralogy (30 countries).

In Table 2, countries have been arranged in the descending order according to the number of papers contributed by foreign scientists hailing from them.

It is seen that of the first five countries providing a sufficient member of contributions for publication in Indian periodicals, four (viz. USA, UK, Japan and Canada) are highly developed countries in various branches of science

Table 1: Breakdown of Subject Scatter.

Sl. No.	UDC Class	Subject	No. of countries covering the papers	No. of periodicals publishing papers	No. of published papers
1.	51	Mathematics	41	18	231
2.	52	Astronomy, Surveying, Geodesy	9	8	33
3.	53	Physics & Mechanics	32	32	209
4.	54	Chemistry, Crystallography, Minrology	30	21	289
5.	55	Geology, Metereology	21	19	60
6.	56	Palaeontology	6	5	6
7.	57	Biology, Anthropology	33	29	115
8.	58	Botany	20	15	40
9	59	Zoology	20	16	38
10.	61	Medical Sciences, Health & Safety	40	47	183
11.	62	Engineering & Technology, Generally	34	53	182
12.	63	Agriculture, Forestry, Stockbreeding, Fisheries	27	36	88
13.	65	Commercial, Official, Business Techniques, Management Communications, Transport	5	5	6
14.	66	Chemical Industry, Chemical Technology	26	31	83
15.	67	Manufactures, Industries & Crafts	10	12	30
16.	68	Specialised Trades, Crafts & Industries.	2	2	2

Table 2: *Countrywise scatter of papers in different subjects (Represented as UDC numbers)*

S. No.	Country	51	52	53	54	55	56	57	58	59	61	62	63	65	66	67	68	Total	Percentage
1	U. S. A.	72	13	54	24	13	1	33	11	12	59	27	14	2	11	3	1	350	21.91%
2	EGYPT	30	-	37	180	6	1	3	-	1	6	11	5	-	19	12	-	311	19.47%
3	U. K.	12	10	12	14	7	-	5	1	3	34	32	1	-	11	5	-	147	9.20%
4	JAPAN	18	1	7	5	-	-	6	2	1	7	21	2	1	3	2	-	76	4.75%
5	CANADA	25	-	13	3	-	1	5	1	-	7	14	1	1	-	2	-	73	4.57%
6	AUSTRALIA	11	2	5	6	5	-	7	1	3	2	6	3	-	2	2	-	55	3.44%
7	W. GERMANY	4	-	-	-	-	-	9	4	-	2	12	2	-	6	1	-	40	2.50%
8	U. S. S. R.	1	1	9	12	5	1	4	1	-	-	2	2	-	2	-	-	40	2.50%
9	BANGLADESH	1	-	9	5	3	-	1	1	3	1	-	14	-	1	-	-	39	2.44%
10	NIGERIA	8	-	1	1	1	1	3	2	1	5	2	6	1	2	1	-	35	2.20%
11	IRAQ	1	-	6	-	2	-	2	-	1	4	6	4	-	1	-	1	28	1.75%
12	SRI LANKA	1	-	1	4	2	-	-	-	-	4	-	6	-	4	-	-	22	1.37%
13	SAUDI ARABIA	2	-	7	2	-	-	1	1	1	2	1	1	-	1	1	-	20	1.25%
14	FRANCE	1	1	4	1	-	-	-	4	-	1	5	1	-	-	-	-	18	1.12%
15	ITALY	1	-	6	-	-	-	5	-	1	1	2	-	-	1	-	-	17	1.06%
16	THAILAND	-	-	-	-	-	-	1	-	1	2	7	3	1	1	-	-	16	1.00%
17	SWITZERLAND	1	1	2	-	-	-	1	-	-	7	2	-	-	1	-	-	15	0.93%
18	SINGAPORE	-	-	7	-	-	-	-	1	1	-	4	-	-	2	-	-	15	0.93%
19	PAKISTAN	-	-	3	3	1	-	-	-	1	4	-	-	-	2	-	-	14	0.87%
20	NEW ZEALAND	5	-	-	-	1	-	2	-	-	1	1	2	-	-	-	-	12	0.75%
21	IRAN	2	-	1	3	-	-	1	-	-	4	-	-	-	-	1	-	12	0.75%
22	KUWAIT	2	-	4	-	1	1	1	-	-	1	1	1	-	-	-	-	12	0.75%
23	POLAND	1	-	3	-	-	-	2	-	-	1	2	-	-	3	-	-	12	0.75%
24	LIBYA	3	-	2	-	-	-	-	-	-	2	4	-	-	-	-	-	11	0.68%
25	NETHERLAND	3	-	1	-	-	-	3	1	-	1	-	1	-	-	-	-	11	0.68%
26	BRAZIL	2	-	-	2	-	-	4	-	1	1	-	-	-	-	-	-	10	0.62%
27	MALAYSIA	-	-	2	-	-	-	1	1	-	1	-	3	-	2	-	-	10	0.62%
28	(42) COUNTRIES	24	4	13	24	13	-	15	8	7	23	20	16	-	8	-	-	174	10.90%
		231	33	209	289	60	6	115	40	38	183	182	88	6	83	30	2	1595	-

and technology. USA tops the list with the maximum contribution i.e. 350 papers (21.91%) the highest number of papers, (72) in mathematics. Next in the order is Egypt with a total of 311 papers (19.5%); of these, 180 papers are in chemistry - crystallography -mineralogy group.

Thus, it is observed that in chemistry-crystallography group, scientists from Egypt are providing a lot of literature for publication. The foreign literature contributions being published in chemistry come mostly (viz.62%) from Egypt. In other words, Egyptian scientists are patronizing Indian chemical journals in a big way, thereby indicating that the Indian periodicals have matured into an international medium of communication for chemical research work, particularly for the developing world. The papers are uniformly distributed in different subjects with slight fluctuations. It is observed that the first group of countries (1-5) has the maximum contribution of papers (viz. 59.9%) in Indian periodicals. The next group of countries contributing 13.08% is followed by groups with 6.55, 4.48, 3.61% contributions.

A persual of Table 3 shows that there are at least 25 Indian periodicals in which 10 or more foreign contributions in various scientific disciplines have been published. *Indian journal of Chemistry* published the maximum number of papers (164) by foreign scientists dealing with the UDC class numbers 53, 54, 62 and 67. Next comes the *Indian Journal of Pure and Applied Mathematics* with 73 papers, *Journal of Information and Optimization Sciences* with 60 and *Indian Journal of Technology* with 52 papers.

It is further seen from Table 3 that *Current Sciencc* is the only Indian periodical that covers most of the branches of pure and applied sciences. Most of the periodicals in Table 3 are interdisciplinary in nature covering 4 or 5 subjects. There are very few periodicals (e.g. *Journal of Astronomy and Astrophysics, Indian Journal of paediatrics,* etc.) which specifically deal with a particular subject.

Table 3: Overall Ranking of Periodicals in All Scientific Subjects

Rank	Title of Periodicals	No. of Papers	Subject Coverage (UDC Class Nos.)
1.	Indian Journal of Chemistry	164	53,54,62,67
2.	Indian Journal of Pure and Applied Mathematics	73	51,53
3.	Journal of the Indian Chemical Society	65	54,57,62,63,66
4.	Journal of Information & Optimization Sciences	60	51,65,68
5.	Indian Journal of Technology	52	53,54,55,62,63,66,67
6.	Indian Journal of Biochemistry and Biophysics	47	54,57,61
7.	Indian Journal of Physics	45	52,53,54
8.	Sankhya	40	51

1	2	3	4
9.	Acta Anthropogenetica	39	57,61
10.	Regional Journal of Energy, Heat and Mass Transfer	32	53,62,63,66,67
11.	Bulletin of the Calcutta Mathematical Society	28	51,53
12.	Proceedings of the Indian National Science Academy - Pt. A.	28	51,52,53,54
13.	Journal of the Institution of Engineers, India	25	52,53,62,65,68
14.	Indian Journal of Pediatrics	24	61
15.	Indian Journal of Pure and Applied Physics	24	53
16.	Current Science	22	52,53,54,55,56,57, 58,59,61,63
17.	Journal of Applied Medicine	22	61
18.	Indian Journal of Experimental Biology	20	57,59,61,63
19.	Proceedings of the Indian Academy of Science - Chemical Sciences	19	54
20.	Journal of Mathematical and Physical Sciences	18	51,53
21.	Bulletin of Materials Science	17	53,54,62,66
22.	Journal of the Institution of Electronics and Telecommunication Engineers	17	52,53,62
23.	Journal of Astrophysics and Astronomy	15	52
24.	Indian Journal of Theoretical Physics	14	53
25.	Phytomorphology	15	57,58

RESULTS AND DISCUSSION

The present analysis indicates that chemistry-crystallography-mineralogy group is a crucial subject area in which the maximum number of foreign contributions have been published, from this, it can also be inferred that Indian periodicals in this subject area are comprehensive in their scope, so that there seems to be a need to have some more specific periodicals. There also is a need to publish some more Indian periodicals in areas like agriculture, astronomy, botany, geology and zoology. It also appears that certain Indian periodicals have come up to the international standard and the research work being published in them by both Indian and foreign scientists appears to be well-recognized and linked with the international science, because the literature cited in them has both currency and relevance. Further, these journals are being published punctually. These prestigeous periodicals attract very good contributions from foreign authors and get wide coverage in secondary periodicals.

In the present study a total of 31,274 entries, including 1720 for theses, patents and standards were taken from *ISA* for two years [9]. If we exclude the entries for theses, patents and standards the number of entries is 28,554, which includes both Indian and foreign contributions in Indian periodicals covered by ISA. Foreign scientists' contributions constitute just 1595 (5.4%) of the total of 29,554 entries for this period. In this context, it would be pertinent to mention Rangarao's observation [10] that in applied sciences the number of papers contributed by foreign scientists in Indian periodicals is nearly the same as that by Indian scientists in foreign periodicals, whereas in basic sciences this ratio is 8:1 in favour of foreign periodicals. 58% Indian scientists are publishing in foreign periodicals [7], while the present study shows that only 5.4% of Indian periodical literature is contributed by foreign scientists. This suggests that a large number of Indian scientists publish abroad and only a few foreign scientists publish in Indian periodicals.

Several factors are responsible for this, as pointed out by Bhavani [11] like, refereeing system, availability of periodicals in various subject areas and subareas, wide circulation and coverage by secondary periodicals, international recognition due to professional association of some Indian scientists with certain foreign institutions, assessment of individual capacity, publisher's concessions, etc. The factors detering foreign scientists from publishing in Indian periodicals may be:

(i) Low international standard of Indian periodicals,

(ii) absence of specialization in some specific subject areas.

(iii) lack of regularity/punctuality of publication and poor circulation of periodicals, and

(iv) low coverage of Indian periodicals in the international indexing and abstracting periodicals.

Removal of these deficiencies could certainly help in attracting more foreign contributions. The factors promoting foreign scientists to contribute to Indian periodicals include,

(i) their earlier rejection by prestigeous periodicals and resubmission to Indian periodicals,

(ii) the contributions may belong to the category of non-significant literature,

(iii) most of the contributions may be coming from under-developed countries.

(iv) papers may be contributed by those scientists who are included in the editorial boards of the concerned journals.

(v) some of the research papers may be contributed on invitation/request,

(vi) some scientists may have preference for publishing their papers in foreign periodicals.

CONCLUSIONS

The tendency of scientists the world over to publish their works in prestigeous periodicals has great relevance in the Indian context, since little material of high quality is being submitted for publication in Indian scientific periodicals. It should not become customary for an Indian Institution to publish a periodical of its own without due regard to its editorial standards, quality of papers and print and international recognition of its published works. The present analysis draws attention to the needs to improve the quality and standard of Indian scientific periodicals so that more of these are covered by the international secondary periodicals and more foreign scientists get tempted to publish their research contributions in these periodicals. Although it is not our concern here to pinpoint the factors that may go into raising the scope for improvement of editorial standard and quality of Indian research work in periodicals, suffice it to say that subject specialists can play a crucial role in this respect.

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APPENDIX 1

Classified List of Core Indian Periodicals in Different Subjects Covering Ten or More Foreign Papers (Listed according to the UDC)

UDC No.	Subject	Title of Periodicals	No. of Papers
1	2	3	4
51	Mathematics	1. Indian Journal of Pure & Applied Mathematics	59
		2. Journal of Information Optimization Sciences	57
		3. Sankhya	38
		4. Bulletin of the Calcutta Mathematical Society	23
		5. Journal of Mathematical and Physical Sciences	12
52	Astronomy, Surveying, Geodery	1. Journal of Astrophysics and Astronomy	15
		2. Proceedings of the Indian National Science Academy - Pt. A	11
53.	Physics & Mechanics	1. Indian Journal of Physics	42
		2. Indian Journal of Pure and Applied Physics	24
		3. Indian Journal of Technology	15
		4. Indian Journal of Theoretical Physics	14
		5. Indian Journal of Pure and Applied Mathematics	14
		6. Bulletin of Materials Science	12
54	Chemistry, Crystallography, Mineralogy	1. Indian Journal of Chemistry	160
		2. Journal of the Indian Chemical Society	160
		3. Proceedings of the Indian Academy of Sciences - Chemical Sciences	19

1	2	3	4
		4. Proceedings of the Indian National Science Academy Pt. A	13
		5. Indian Journal of Technology	12
55	Geology, Meteorology	1. Mavsam	14
		2. Journal of the Geological Society of India	12
57	Biology, Anthropology	1. Indian Journal of Biochemistry and Biophysics	4
		2 Acta Anthropogenetica	35
58	Botany	1. Phytomorphology	10
61	Medical Sciences, Health and Safety	1. Indian Journal of Pediatrics	24
		2. Journal of Applied Medicine	22
		3. Indian Journal of Experimental Biology	13
62	Engineering & Technology, Generally	1. Journal of the Institution of Engineers, India	20
		2. International Journal of Structures	15
		3. Regional Journal of Energy, Heat, and Mass Transfer	14
		4. Journal of the Institution of Electronics and Telecommunication Engineers	11
63	Agriculture, Forestry Stock-breeding, Fisheries	1. Indian Journal of Agricultural Sciences	12
66	Chemical Industry, Chemical Technology	1 Regional Journal of Energy, Heat and Mass Transfer	10

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CITATION PATTERN IN LEATHER SCIENCE

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Studies citation pattern in leather science from references and citations taken from the journal Leather Science. Analysis show that more than 50% of journals cited are non-leather. Also appends a ranked list of leather and non-leather periodicals.

INTRODUCTION

The present study is concerned with the citation pattern of the references and citations in the articles, communications and letters to the editor that appeared in Volume 28 (1981) of *Leather Science*, a monthly journal brought out by the Central Leather Research Institute, Madras.

The importance of citations as a rich source of data for various bibliometric studies has been recognised widely. The data help the library to know the study habits of the scientists whereby it could render better reference service as well as SDI service and also make the acquisition programmes more meaningful. According to Price[1], the pattern of bibliographic references indicates the nature of the scientific research front. The present study reveals the inter-disciplinary nature of the subject of leather science.

OBSERVATIONS

The citation counting of *Leather Science* 1981, yielded a total of 503 citations distributed as follows: journals 346 (68.79%), books/symposia 119 (23.66%), patents 17 (3.38%), standards 4 (0.80%), and theses and project reports 17 (3.38) [Fig. 1]. The journal citations alone were taken up for further analysis and the count of citations to (1) Indian, (2), foreign, (3) leather, (4) non-leather, and (5) non-English leather literature was taken.

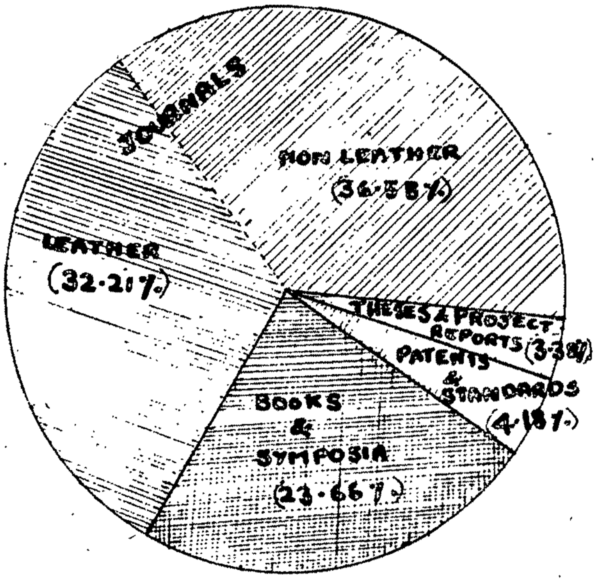

Fig. 1: Breakup of citations according to type of literature sources.

The relatively low percentage of citations pertaining to books/symposia and theses/reports may be ascribed to the fact that the number of such documents published in this subject is low compared to other subjects.

Patent citations are also found to be very low, though patents are accepted universally as an important source of information. According to Gorin[2], most scientific and technological observations and developments are first made public in journals or in patents. Liebesny[3] also observes that patent literature can be a very fruitful and useful source of technical and even legal information, whose value is, however, rarely and not fully appreciated.

The low use of patents was observed in a previous study on the use of patent documents too[4]. It was found that the published literature for the period 1972-76 in the defined four core periodicals, viz. *Leather Science, Das Leder, Journal of the American Leather Chemists Association* and *Journal of the Society of Leather Technologists and Chemists*, showed no appreciable number of citations to patent literature.

Though a study on Indian patents in leather and allied fields[5] revealed that as many as 1178 patents were available during the period 1912-1972, only 17 patents are cited in Volume 28 of *Leather Science* (1981). Even taking that all these patents may not be obviously related to the papers published in 1981, it may still be concluded that the wealth of patent literature has not been exploited fully or to the desired extent.

Out of the total of 346 citations to journals, only 93 citations are to Indian journals and the remaining 253 to foreign journals (Tables 1 and 2).

It is observed that *Leather Science* is the highest ranked journal (73 citations) followed by *Journal of the American Leather Chemists Association* (25 citations), *Das leder* and its predecessor, *Collegium,* top the list among the ranked non-English periodicals (13 citation) (Table 3). The importance of these journals is confirmed by the observation of their heavy use in the library.

It is notable that there is not a single citation to *Leather* and *Leather Manufacturer,* which are considered as important periodicals by leather scientists and technologists. This may be explained by the fact that these two journals are more commercial in nature and contain mostly commercial and technical news items.

It is observed that more than 50% of the journals cited are non-leather ones. The main reason for this as given by Padamanabhan[6] is that leather science is a multidisciplinary science drawing on many other sciences. The development of leather science is conditioned by advances in chemical technology and textile technology. Besides these two main related subjects, other sciences like animal biology, animal husbandry and veterinary science, microbiology and entomology, histology, protein chemistry and leather forming protein (collagen) which have considerable interaction with subjects like X-ray diffraction and electron microscopy, plant physiology, polymer science and technology are also highly related to leather manufacture. This explains why there are so many citations from journals like *Journal of Polymer Science* (19), *Biochemical Journal* (11), *Makromoleculare Chemie* (7) and *Phytochemistry* (6) (Table 4).

Table 1

Ranked List of Indian Periodicals

Sl. No.	Title	No. of citations	% out of 503 (total citations)	% out of 346 (journal citations)	% out of 93 (Indian journal citations)
1.	Leather Science	73	14.51	21.10	78.49
2.	Journal of the Indian Leather Technologists Association	8	1.59	2.31	8.60
3.	Tanner	5	0.99	1.45	5.38
4.	Indian Journal of Chemistry	3	0.60	0.87	3.23
5.	Indian Journal of Medical Research	2	0.40	0.58	2.15
6.	Others (appearing only once) (2 journals)	1	0.20	0.29	1.08

Table 2

Ranked List of Foreign Periodicals

Sl. No.	Title	No. of citations	% out of 503 (total citations)	% out of 346 (journal citations)	% out of 93 (foreign journal citations)
1.	Journal of the American Leather Chemists Association	25	4.97	7.23	9.88
2.	Journal of Polymer Science	19	3.78	5.49	7.51
3.	Journal of the Society of Leather Technologists and Chemists	18	3.58	5.20	7.11
4.	Biochemical Journal	11	2.19	3.18	4.35
5.	Das Leder	9	1.79	2.60	3.56
6.	Makromolekulare Chemie	7	1.39	2.02	2.77
7.	Transactions of the British Mycological Society	7	1.39	2.02	2.77
8.	Phytochemitry	6	1.19	1.73	2.37
9.	Arthritis and Rheumatism	5	0.99	1.45	1.98
10.	Biochemical Pharmacology	5	0.99	1.45	1.98
11.	Journal of Physical Chemistry	5	0.99	1.45	1.98
12.	Collegium	4	0.80	1.16	1.58
13.	Nature	4	0.80	1.16	1.58
14.	Radiation Research	4	0.80	1.16	1.58
15.	Science	4	0.80	1.16	1.58
16.	British Journal of Nutrition	3	0.60	0.87	1.19
17.	Journal of Chemical Physics	3	0.60	0.87	1.19
18.	Journal of Chromatography	3	0.60	0.87	1.19
19.	Transactions of the Faraday Society	3	0.60	0.87	1.19
20.	Biochimica et Biophysica Acta	2	0.40	0.58	0.79
21.	Clinical Science	2	0.40	0.58	0.79
22.	Doc. Sci. et Tech. Inds Cuir	2	0.40	0.58	0.79
23.	Electrochemica Acta	2	0.40	0.58	0.79
24.	Federation Proceedings	2	0.40	0.58	0.79
25.	Gakkaishi	2	0.40	0.58	0.79
26	Inorganic Chemistry	2	0.40	0.58	0.79
27.	Journal of Applied Polymer Science	2	0.40	0.58	0.79
28.	Journal of Biological Science	2	0.40	0.58	0.79
29.	Journal of Chemical Society	2	0.40	0.58	0.79
30.	Journal of Experimental Medicine	2	0.40	0.58	0.79

Sl. No.	Title	No. of citations	% out of 503 (total citations)	% out of 346 (journal citations)	% out of 93 (foreign journal citations)
31.	Journal of Molecular Biology	2	0.40	0.58	0.79
32.	Journal of the American Chemical Society	2	0.40	0.58	0.79
33.	Polymer	2	0.40	0.58	0.79
34.	Rassegna Chimica	2	0.40	0.58	0.79
35.	Shoe and Leather Reports	2	0.40	0.58	0.79
36.	Other journals (appearing only once) (76 journals)	1	0.20	0.29	0.40

Table 3

Ranked List of Leather Periodicals

Sl. No.	Title	No. of citations	% out of 503 (total citations)	% out of 346 (journal citations)	% out of 162 (leather journal citations)
1.	Leather Science	73	14.51	21.10	45.06
2.	Journal of the American Leather Chemists Association	25	4.97	7.23	15.43
3.	Journal of the Society of Leather Technologists and Chemists	18	3.58	5.20	11.11
4.	Das Leder	9	1.79	2.60	5.56
5.	Journal of the Indian Leather Technologists Association	8	1.59	2.31	4.94
6.	Tanner	5	0.99	1.45	1.45
7.	Collegium	4	0.80	1.16	2.47
8.	Doc. Sci. et Tech. Indus. Cuir	2	0.40	0.58	1.23
9.	Shoe and Leather Reporter	2	0.40	0.58	1.23
10.	Other journals (appearing only once) (16 journals)	1	0.20	0.29	0.62

Table 4

Ranked List of Non-leather Periodicals

Sl. No.	Title	No. of citations	% out of 503 (total citations)	% out of 346 (journal citations)	% out of 184 (non-leather journal citations)
1.	Journal of Polymer Science	19	3.78	5.49	10.33
2.	Biochemical Journal	11	2.19	3.18	5.96
3.	Makromolekulare Chemie	7	1.39	2.02	3.80
4.	Transactions of the British Mycological Society	7	1.39	2.02	3.80
5.	Phytochemistry	6	1.19	1.73	3.26
6.	Arthritis and Rheumatism	5	0.99	1.45	2.72
7.	Biochemical Pharmacology	5	0.99	1.45	2.72
8.	Journal of Physical Chemistry	5	0.99	1.45	2.72
9.	Nature	4	0.80	1.16	2.17
10.	Radiation Research	4	0.80	1.16	2.17
11.	Science	4	0.80	1.16	2.17
12.	British Journal of Nutrition	3	0.60	0.87	1.63
13.	Indian Journal of Chemistry	3	0.60	0.87	1.63
14.	Journal of Chemical Physics	3	0.60	0.87	1.63
15.	Journal of Chromatography	3	0.60	0.87	1.63
16.	Transactions of the Faraday Society	3	0.60	0.87	1.63
17.	Biochimica et Biophysics Acta	2	0.40	0.58	1.09
18.	Clinical Science	2	0.40	0.58	1.09
19.	Electrochemica Acta	2	0.40	0.58	1.09
20.	Federation Proceedings	2	0.40	0.58	1.09
21.	Gakkaishi	2	0.40	0.58	1.09
22.	Indian Journal of Medical Research	2	0.40	0.58	1.09
23.	Inorganic Chemistry	2	0.40	0.58	1.09
24.	Journal of American Chemical Society	2	0.40	0.58	1.09
25.	Journal of Applied Polymer Science	2	0.40	0.58	1.09
26.	Journal of Biological Chemistry	2	0.40	0.58	1.09
27.	Journal of Chemical Society	2	0.40	0.58	1.09
28.	Journal of Experimental Medicine	2	0.40	0.58	1.09
29.	Journal of Molecular Biology	2	0.40	0.58	1.09
30.	Polymer	2	0.40	0.58	1.09
31	Rassegna Chimica	2	0.40	0.58	1.09
32	Other journals (appearing only once) (78 journals	1	0.20	0.29	0.54

Another notable feature is that the foreign language leather periodicals like *Kozarstvi,* and *Kozhevenno-Obuvnaya Promishlennost* (Russian) which have been identified earlier[7] as core periodicals have not been cited (Table 5). This may be due to the language barrier in scientific communications. A good translation service for English speaking scientists is needed to enable them to make effective use of the important non-English literature.

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Table 5

Ranked List of Non-English Leather Priodicals

Sl. No.	**Title**	**No. of citations**	**% out of 503 (total citations)**	**% out of 346 (journal citations)**	**% out of 40 (non-English leather journal citations)**
1.	Das Leder	9	1.79	2.60	22.50
2.	Collegium	4	0.80	1.16	10.00
3.	Doc. Sci. et Tech. Indus. Cuir	2	0.40	0.58	5.00
4.	Other journals (appearing only once) (25 journals)	1	0.20	0.29	2.50

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CORE JOURNALS IN SYNTHETIC ORGANIC CHEMISTRY

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Citation study of one secondary Journal, Journal of Synthetic Methods, and one primary Journal, Synthesis, has been conducted to evaluate and identify the relevance of primary journals. Analysis of citations have been made and periodicals cited have been ranked.

Efficient information services from comprehensive bibliographic databases, covering the world scientific and technical literature increase the demand of users for primary journals. Undoubtedly, there is a tremendous volume of redundant information in the existing and newly produced literature. Some authors estimate that only about 10% of the published literature in science and technology contains new facts and ideas and the rest is duplicated information [1].

The tremendous growth of chemical literature has reflected in the 10th *Collective Index of Chemical Abstracts,* comprising 75 volumes of 128,000 pages. Total abstracts referenced are 2,202,000 (1,897,000 non-patents and 305,000 patents).

As explicitly stated by Bradford, relatively a small number of core journals contain a substantial portion of journal literature having bearing on a particular subject. The rest of the literature is scattered in a large number of primary journals [3]. Eugene Garfield has successfully developed citation analysis as a tool for the evaluation of primary journals [4]. List of core journals based on citation studies has been compiled in various subjects [5-11].

The process of selective acquisition, due to constraints on library budget and escalating cost of subscriptions has made essential the identification of reasonably more relevant journals that report substantial portion of literature in synthetic organic chemistry. Therefore, a study has been conducted to identify such journals and compile a list of core journals on the subject on the basis of citation analysis of one secondary journal and one primary journal. For the purpose of analysis, the *Journal of Synthetic Methods* (secondary) and *Synthesis* (primary) have been selected as source journals.

SCOPE OF THE JOURNALS SELECTED FOR THE STUDY

The *Journal of Synthetic Methods* is a monthly abstracting publication of Chemical Reactions Documentation Service of Derwent Publications Limited, London, providing systematically up-to-date literature on:

- Novel or unusual reactions and new organic synthetic methods.
- Known process effected by new reagents or improved organic synthetic methods.
- Interesting applications and extension of known reactions in the organic synthetic methods.

Synthesis is devoted to the publication of research papers in the field of new synthetic methods, significantly improved synthetic methods, new and/or significantly improved preparations of key substances and new class of compounds in synthetic organic chemistry.

METHODOLOGY

Abstracts of *Journal of Synthetic Methods* Vol.7, 1981 (12 issues) have been examined to ascertain the primary sources. Similarly, the bibliographical references cited in every issue of *Synthesis,* 1981 (12 issues) have been analysed.

ANALYSIS

Dispersion of literature (Table 1) reveals that in both the periodicals, journal articles have been noticed more in number i.e. 3099 (91.12%) and 6203 (88.06%), which shows not only their importance in communicating scholarly literature but also the extent to which the scientists depend upon this publicatio for getting their work published. Next comes books and patents.

Table 1 : Dispersion of literature

Type of Documents	References Abstracted in Journal of Synthetic Methods 1981		References cited in Synthesis 1981	
	No. of references	Percentage	No. of references	Percentage
Journal articles	3099	91.12	6203	88.05
Books	34	1.00	536	7.61
Patents	268	7.88	226	3.21
Dissertations/Thesis	-	-	42	0.60
Conference Papers	-	-	19	0.26
Reports	-	-	11	0.16
Unpublished/Private communications	-	-	8	0.11
Total :	3401	100.00	7045	100.00

Table 2 : List of journals cited in Synthesis 1981

Rank No.	Name of the Journal	Number of Citations	Cumulative Number of Citations	%	Cumulative %
1.	Journal of American Chemical Society	883	883	14.23	14.23
2.	Journal of Organic Chemistry	736	1619	11.86	26.09
3.	Tetrahedron Letters	618	2237	9.97	36.06
4.	Synthesis	385	2622	6.21	42.27
5.	Chemische Berichte	306	2928	4.93	47.20
6.	Journal of the Chemical Society	201	3129	3.24	50.44
7.	Journal of the Chemical Society: Chemical Communication	188	3317	3.03	53.47
8.	Liebigs Annalen der Chemie	160	3477	2.57	56.04
9.	Tetrahedron	152	3629	2.45	58.49
10.	Angewandte Chemie	136	3765	2.20	60.69
11.	Helvetica Chemica Acta	112	3877	1.80	62.49
12.	Journal of Organometallic Chemistry	110	3987	1.77	64.26
13.	Bulletin of Chemical Society of France II	104	4091	1.67	65.93
14.	Bulletin of Chemical Society of Japan	94	4185	1.51	67.44
15.	Journal of Chemical Society : Perkins Trans I	76	4261	1.22	68.66
16.	Canadian Journal of Chemistry	64	4325	1.03	69.69
17.	Journal of Heterocyclic Chemistry	56	4381	0.90	70.62
17.	Chemical and Pharmaceutical Bulletin	56	4437	0.90	71.52
17.	Chemical Reviews	56	4493	0.90	72.42

CORE JOURNALS IN CHEMISTRY

Rank No.	Name of the Journal	Number of Citation	Cumulative Number of Citations	%	Cumulative %
18.	Recueil des Travaux Chimiques Pays-Bas (Journal of Royal Netherland Chemical Society)	55	4547	0.88	73.30
18.	Journal of the Chemical Society "C"	55	4602	0.88	74.18
19.	Chemistry Letters	51	4653	0.82	75.00
20.	Comptes Rendus Series "C"	48	4701	0.77	75.77
21.	Australian Journal of Chemistry	40	4741	0.64	76.41
22.	Monatshefte fur Chemie	37	4778	0.59	77.00
22.	Zeitschrift fur Naturforschung Sec. B	37	4815	0.59	77.59
23.	Acta Chemica Scandinavica Series B	35	4850	0.56	78.15
24.	Zhurnal Obschchei Khimii	34	4884	0.54	78.69
24.	Collection of Czechoslovak Chemical Communications	34	4918	0.54	79.23
25.	Chemistry and Industry	32	4950	0.52	79.75
26.	Journal of Biological Chemistry	30	4980	0.48	80.23
27.	Izvestiya Akademii Nauk SSSR Ser: Khimicheskaya	28	5008	0.45	80.68
27.	Acta Chimica Hungarica	28	5036	0.45	81.13
28.	Heterocycles	27	5063	0.43	81.56
28.	Gazetta Chemica Italiana	27	5090	0.43	81.99
28.	Zhurnal Organicheskoi Khimii	27	5117	0.43	82.42
29.	Carbohydrate Research	26	5143	0.42	82.84
30.	Journal of Medicinal Chemistry	25	5168	0.40	83.24
31.	Synthetic Communications	24	5192	0.38	83.62
32.	Journal fuer Praktische Chemie	22	5214	0.35	83.97
32.	Journal of General Chemistry of USSR	22	5236	0.35	84.32
33.	Biochemistry	21	5257	0.33	84.65
33.	Journal of Chemical Research (S)	21	5278	0.33	84.98
34.	Zeitschrift fuer Physiologische Chemie	20	5298	0.32	85.30
35.	Indian Journal of Chemistry Sec. B	19	5317	0.30	85.60
36.	International Journal of Peptide and Protein Research	18	5335	0.29	85.89
37.	Accounts of Chemical Research	17	5352	0.27	86.16
38.	Archive der Pharmazie	15	5367	0.24	86.40
39.	Nature	14	5384	0.22	86.62
40.	Pure and Applied Chemistry	13	5394	0.20	86.82
40.	Dokladui Akademii Nauk SSSR	13	5407	0.20	87.02
40.	Kontakke	13	5420	0.20	87.22
41.	Khimiya Geterotsiklicheskikh Soedinenii	11	5431	0.17	87.39
41.	Bulletin des Societies Chimique Belges	11	5442	0.17	87.56
42.	Yakugaku Zasshi	10	5452	0.16	87.72
43.	Journal of Indian Chemical Society	9	5461	0.14	87.86

Rank No.	Name of the Journal	Number of Citation	Cumulative Number of Citations	%	Cumulative %
44.	Zeitschrift fur Chemie	8	5469	0.12	87.98
44.	Chemiker - Zeitung	8	5477	0.12	88.10
44.	Organic Preparations and Procedures - International	8	5485	0.12	88.22
44.	Israel Journal of Chemistry	8	5493	0.12	88.34
44.	Annals of New York Academy of Sciences	8	5501	0.12	88.46
45.	Journal of Pharmaceutical Sciences	7	5508	0.11	88.57
45.	Chemical Society Reviews	7	5515	0.11	88.68
46.	Polish Journal of Chemistry	6	5521	0.09	88.77
46.	Die Pharmazie	6	5527	0.09	88.86
47.	Yuki Goseikagaku Kyokaishi	4	5531	0.06	88.92
47.	European Journal of Medicinal Chemistry	4	5535	0.06	88.98
47.	Russian Chemical Reviews	4	5539	0.06	89.04
47.	Nouveau Journal de Chemie	4	5543	0.06	89.10
	Other 254 Journals	660	6203	10.64	99.74

Table 3 : List of journals abstracted in Journal of Synthetic Methods 1981

Rank No.	Name of the Journal	Abstracted in Journal of Synthetic Methods	Cumulative number of Abstracts	%	Cumulative %
1.	Tetrahedron Letters	411	411	13.26	13.26
2.	Journal of Organic Chemistry	324	735	10.45	23.71
3.	Synthesis	201	936	6.48	30.19
4.	Journal of Chemical Society : Chemical Communications	180	1116	5.80	35.99
5.	Journal of American Chemical Society	140	1256	4.51	40.50
6.	Chemistry Letters	113	1369	3.64	44.14
6.5	Heterocycles	113	1482	3.64	47.78
7.	Tetrahedron	87	1569	2.80	50.58
8.	Journal of Heterocyclic Chemistry	81	1650	2.61	53.19
9.	Chemical and Pharmaceutical Bulletin	79	1729	2.54	55.73
10.	Bulletin of the Chemical Society of Japan	76	1805	2.45	58.18
11.	Zhurnal Organicheskoi Khimi	75	1880	2.42	60.60
12.	Synthetic Communications	74	1954	2.38	62.98
13.	Chemische Berechte	67	2021	2.16	65.14
14.	Liebigs Annalen der Chemie	66	2087	2.12	67.26
14.5	Angewandte Chemie	66	2153	2.12	69.38
15.	Journal of Chemical Society: Perkins Trans I	61	2214	1.96	71.34

CORE JOURNALS IN CHEMISTRY

Rank No.	Name of the Journal	Abstracted in Journal of Synthetic Methods	Cumulative number of Abstracts	%	Cumulative %
16.	Izvestiya Akademii Nauk SSSR Ser Khimii	53	2267	1.71	73.05
16.5	Khimiya Geterotskilicheskikh Soedinenii	53	2320	1.71	74.76
17.	Journal of Medicinal Chemistry	49	2369	1.58	76.34
18.	Zhurnal Obschei Khimii	47	2416	1.51	77.85
19.	Indian Journal of Chemistry "B"	46	2462	1.48	79.33
20.	Journal of Organometallic Chemistry	37	2499	1.19	80.52
21.	Canadian Journal of Chemistry	34	2533	1.09	81.61
22.	Helvetica Chemica Acta	29	2591	0.93	83.47
23.	Armyanskii Khimicheskii Zhurnal	26	2617	0.83	84.30
24.	Collection of Czechoslovak Chemical Communications	21	2638	0.67	84.97
24.5	Bulletin des Societes Chimiques Belges	21	2659	0.67	85.64
25.	Archiv der Pharmazie	18	2677	0.58	86.22
26.	Zeitschrift fuer Chemie	18	2695	0.58	86.80
27.	Organic Preparations and Procedures International	17	2712	0.54	87.34
28.	Australian Journal of Chemistry	16	2728	0.51	87.85
28.5	Carbohydrate Research	16	2744	0.51	88.36
29.	Recueil des Travaux Chimiques des Phys-Bas (Journal of the Royal Netherlands Chemical Society)	15	2759	0.48	88.84
29.5	Journal of Chemical Research (S)	15	2774	0.48	89.32
30.	Journal of Indian Chemical Society	14	2788	0.45	89.77
31.	Monatshefle fuer Chemie	13	2801	0.41	90.18
32.	Zeitschrift fuer Naturferschung Sec B	12	2813	0.38	90.56
32.	Chemistry and Industry	12	2825	0.38	90.94
32.	Polish Journal of Chemistry	12	2837	0.38	91.32
33.	Bulletin of the Chemical Society of France II	10	2847	0.32	91.64
33.	Acta Chimica Hungarica	10	2857	0.32	91.96
34.	Acta Chemica Scandinavica Ser. B	9	2866	0.29	92.25
35.	Journal fuer Praktische Chemie	8	2874	0.25	92.50
36.	Chemical Society Reviews	7	2881	0.22	92.72
36.	European Journal of Medicinal Chemistry	7	2888	0.22	92.94
36.	Russian Chemical Reviews	7	2895	0.22	93.16
37.	Die Pharmazie	6	2901	0.19	93.35
37.	Chemical Reviews	6	2907	0.19	93.54
37.	Nouveau Journal de Chimie	6	2913	0.19	93.73
38.	Comptes Rendus Series 'C'	5	2918	0.16	93.89

1	2	3	4	5	6
38.	Gazzetta Chemica Italiana	5	2923	0.16	94.05
38.	Accounts of Chemical Research	5	2928	0.16	94.21
38.	Pure and Applied Chemistry	5	2933	0.16	94.37
39.	Israel Journal of Chemistry	3	2936	0.09	94.46
39.	Journal of Pharmaceutical Sciences	3	2939	0.09	94.55
40.	Annals of New York Academy of Science	2	2941	0.06	94.61
	Other 100 Journals	158	3099	5.09	99.70

CITATION ANALYSIS

Table 2 reveals the familiar pattern of dispersion of source items in primary periodicals similar to the pattern presented by Bradford. The survey reveals that 75% of the citations came from the first 19 periodicals and the remaining percentage of the references spill over the next 282 titles.

Table 3 also reveals the same pattern, where 80% of the literature came from the first 20 periodicals and the remaining percentage of the references spill over the next 120 titles.

CONCLUSION

The above study discloses the familiar pattern of concentration and dispersion of literature in the field of synthetic organic chemistry. These ranked lists may be used as a tool in evaluating the primary journals in the subject.

The above study has helped us to some extent in the selective acquisition of periodicals in our centre. However, it has some limitations. High frequency of citations does not invariably indicate correspondingly a high intrinsic quality of journals. Frequency of citation is influenced by the reputation of author(s), reprint dissemination, coverage in secondary services, language and national bias.

However, the result of this analysis not only helps special library management but also specialist readers in selecting the periodicals more relevant to their field to keep themselves abreast with new developments in their specialisation. It is also useful in developing a core collection as well as compiling reading lists.

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CHARACTERISTICS OF THE LITERATURE USED BY THE NUTRITIONISTS: A CITATION STUDY

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Analyses the citations appended to three source journals emanating from U.S.A., U.K. and India in the field of nutrition. The findings reveal the main formats of media used, and journals preferred by the nutritionists. The countrywise distribution and chronological scattering of cited journals in the field of nutrition have also been shown.

INTRODUCTION

The characteristics of the literature used by researchers in a field can be studied by questionnaire, direct observation or by citation analysis Of the three methods, citation studies have produced useful results regarding the relative use of various bibliographic forms, preference of journals, country preferred, language, chronological scattering etc. Such studies also help to determine the areas to which a field is related[1]. The application of this technique to the discipline of nutrition is likely to bring out interesting results, which shall be of high value to the acquisition librarians, who at present are encountered with the problem of fast growth of information, numerousness of journals and their increasing cost.

OBJECTIVES OF THE STUDY

The present study aims to identify:

a. the main bibliographic formats used;
b. the core journals;
c. geographical scattering of periodicals; and
d. agewise distribution of cited journals.

SOURCE JOURNALS

Journals play a vital role in the determination of scientific information than any other form of material. As a representative sample three primary journals, one each from U.S.A., U.K., and India covering a period of one year (1981) were selected. They are *American Journal of Nutrition, British Journal of Nutrition,* and *Indian Journal of Nutrition and Dietetics.* The selection of these journals was made on the basis of the primary rank list prepared by counting the primary journals from a recent volume of *Nutrition Abstracts* and reviews and also by consulting the experts in the field. The reason for selecting these three journals was to make a comparison wherever possible of the citation habits of the nutritionists of the three countries mentioned above.

The three source journals have contributed 424 papers which together have cited 9,137 items. On an average each article has yielded 21.63% of references. While American (22.044%) and British (23.049%) journals have almost equal number of average citations per paper, Indian journal has comparatively a lesser number of citations per paper (16.608%).

ANALYSIS AND FINDINGS

Forms of Documents cited

The channels used to communicate scientific research are many and varied. They may be formal or informal means of transmission. When a total of 9,173 references were analysed, it was found that the journals are the major forms of media used with a citation count of 85.55% of the total literature used by nutritionists. The use of non-serial publications has been relatively insignificant except for books (10.47%). This finding is in conformity with the results of the study conducted by Maheswarappa and Surya Rao[2]. The remaining 3.99% of the literature constitutes conference proceedings, reports, theses, standards, reprints, personal communication and the unpublished data.

Citation Habits of Nutritionists: A Comparison

A comparative analysis of the different types of media used by nutritionists from U.S.A., U.K.

Table 1

Formwise distribution of citations; a comparison

Sl. No.	Forms	American Journal of Clinical Nutrition		British Journal of Nutrition		Indian Journal of Nutrition & Dietetics	
		No. of citations	%	No. of citations	%	No. of citations	%
1.	Periodicals	5,209	87.51	2,085	87.83	554	65.41
2.	Books	613	10.30	186	7.84	161	19.01
3.	Conference Proceedings of Symposia/Workshop meetings	34	0.57	49	2.06	69	8.14
4.	Reports	36	0.61	11	0.46	45	5.31
5.	Theses/Dissertations	33	0.55	31	1.31	6	0.71
6.	Preprints	6	0.10	-	-	-	-
7.	Standards	7	0.12	10	0.42	-	-
8.	Personal Communications	-	-	2	0.08	4	0.47
9.	Unpublished data	14	0.24	-	-	8	0.95
	Total	5,952	100.00	2,374	100.00	847	100.00

and India is given in Table 1. As seen from the table the British (87.83%) and the American (87.51%) scientists used a relatively high percentage of periodical literature than Indian (65.4%) scientists in the field of nutrition, while Indian nutritionists use a large number of books (19.01%) than British (7.84%) and American (10.3%) scientists.

Rank List of Journals

A sum of 7,848 citations to four hundred and fifty two journal titles were analysed to find out the frequency with which a journal is cited. Sixty seven periodicals in the order of their rank have been listed (Table 2). Journals having fewer than twenty citations are not included in the rank list. The table shows that the *American Journal of Clinical Nutrition* (10.57%) is the most heavily cited journal and the *British Journal of Nutrition* (5.87%) is the second most frequently used periodical. The third, fourth and the fifth ranking journals are the *Journal of Nutrition* (U.S.A.), *Lancet* (U.K.) and *Journal of Biological Chemistry* respectively, except for the above five journals the remaining 62 titles have yielded less than 3% of citations. Further, with the help of the rank list, it can be inferred that majority of the high ranking journals used by nutritionists are published from U.S.A.

Rank List of Journals: A Comparison

In order to find out the most frequently cited periodicals by American, British and Indian nutritionists, three individual rank lists were prepared. It was found that the contributors to *American Journal of Clinical Nutrition* have heavily cited the same journal (13.89%) followed by *Lancet* (U.K.), *Journal of Nutrition* (USA), *Journal of Clinical Investigation* (USA)

Table 2
Ranking List of Journals in the field of Nutrition

Sl. No.	Rank No.	Journal Title (S = Source Journals)	Country of origin	No. of Citations	Cumulative No. of Citations	Percentage	Cumulative percentage
1	2	3	4	5	6	7	8
1	1	Am J Clin Nutr (S)	U.S.A.	852	852	10.856	10.856
2	2	Br J Nutr (S)	U.K.	461	1313	5.874	16.730
3	3	J Nutr	U.S.A.	394	1707	5.020	21.750
4	4	Lancet	U.K.	331	2038	4.218	25.968
5	5	J Biol Chem	U.S.A.	241	2279	3.071	29.039
6	6	J Clin Invest	U.S.A.	203	2482	2.587	31.626
7	7	Metabolism	U.S.A.	162	2644	2.064	33.690
8	8	Proc Nutr Soc	U.K.	153	2797	1.949	35.639
9	9	New Eng J M	U.S.A.	147	2944	1.873	37.512
10	10	Br Med J	U.K.	137	3081	1.746	39.258
11	11	Am J Physiol	U.S.A.	126	3207	1.606	40.864
12	12	J Anim SC	U.S.A.	119	3326	1.516	42.380
13	13	J Pediatr	U.S.A.	115	3441	1.465	43.845
14	14	Biochem J	U.K.	111	3552	1.414	45.259
15	15	J Lipid Res	U.S.A.	107	3659	1.363	46.622
16	16	Nature	U.K.	99	3758	1.261	47.883
17	17	Gastroenterology	U.S.A.	96	3854	1.223	49.106
18	17	Pediatrics	U.S.A.	96	3950	1.223	50.329
19	18	Clinic Chem Acta	U.S.A.	94	4044	1.198	51.527
20	19	JAMA	U.S.A.	93	4137	1.185	52.712
21	20	Journal Am Diet Asso	U.S.A.	92	4229	1.172	53.884
22	20	Nutr Rep Intl	U.S.A.	92	4321	1.172	55.056
23	21	Proc Soc Exp Biol Med	U.S.A.	86	4407	1.096	56.152
24	22	Fed Proc	U.S.A.	85	4492	1.083	57.235
25	22	Science	U.S.A.	85	4577	1.083	58.318
26	23	Atherosclerosis	Ireland	78	4655	0.994	59.312
27	23	J Lab Clin Med	U.S.A.	78	4733	0.994	60.306
28	24	Biochim Biophy Acta	U.S.A.	74	4807	0.943	61.249
29	25	Am J Obstet Gynecol	U.S.A.	69	4876	0.879	62.128
30	25	Pediatr Res	U.S.A.	69	4945	0.879	63.007
31	26	J Sc Fd Agri	U.K.	65	5010	0.828	63.835
32	27	Gut	U.K.	64	5074	0.815	64.650
33	28	Poult Sci	U.S.A.	60	5134	0.765	65.415
34	29	Jl Agr Sc	U.K.	58	5192	0.739	66.154
35	29	Lipids	U.S.A.	58	5250	0.739	66.893
36	30	J Physiol	U.K.	48	5298	0.612	67.505
37	31	Diabetes	U.S.A.	47	5345	0.599	68.104
38	31	J Clin Path	U.K.	47	5392	0.599	68.703
39	32	Biochim Biophys Res Com	U.S.A.	46	5438	0.586	69.289

1	2	3	4	5	6	7	8
40	32	Indian J Nutr Dietet (S)	India	46	5484	0.586	69.875
41	33	J Dairy Sci	U.S.A.	45	5529	0.574	70.449
42	34	Acta Pediatr Scand	Sweden	44	5573	0.561	71.010
43	34	Int J Vitam Nutr Res	Switzerland	44	5617	0.561	71.571
44	34	J Appl Physiology	U.S.A.	44	5661	0.561	72.132
45	35	Ann Intl Med	U.S.A.	43	5704	0.548	72.680
46	35	Indian J Med Res	India	43	5747	0.548	73.228
47	36	Am J Dis Child	U.S.A.	42	5789	0.535	73.763
48	37	Cereal Chem	U.S.A.	41	5830	0.522	74.285
49	38	Am J Med	U.S.A.	37	5867	0.471	74.756
50	39	J Trop Pediat	U.K.	36	5903	0.459	75.215
51	40	Fed Proc Fed Am Socs Exp Biol	U.S.A.	34	5937	0.433	75.648
52	41	Cancer Res	U.S.A.	33	5970	0.420	76.068
53	41	J Clin Endocrinol Metab	U.S.A.	33	6003	0.420	76.488
54	41	Res Vet Sc	U.K.	33	6036	0.420	76.908
55	42	Circulation	U.S.A.	32	6068	0.408	77.316
56	43	Nutr Metab	Switzerland	31	6099	0.395	77.711
57	44	Acta Med Scand	Sweden	30	6129	0.382	78.093
58	44	Scand J Clin Lab Invest	U.K.	30	6159	0.382	78.475
59	45	Human Biol	U.S.A.	29	6188	0.370	78.845
60	45	J Agr Fd Chem	U.S.A.	29	6217	0.370	79.215
61	45	J Fd Sc	U.S.A.	29	6246	0.370	79.585
62	46	Blood	U.S.A.	24	6270	0.306	79.891
63	47	Am J Epidemiology	U.S.A.	23	6293	0.293	80.184
64	48	Analys Chem	U.S.A.	22	6315	0.280	80.464
65	48	Endocrinology	U.S.A.	22	6337	0.280	80.744
66	49	Indian Pediatr	India	21	6358	0.268	81.012
67	50	Can J Anim Sc	Canada	20	6378	0.255	81.267
67		Total		6378	6378	81.267	81.267
385	(Other titles each having less than twenty citations)			1470	1470	18.733	18.733
452				7848	7848	100.000	100.000

and *Journal of Biological Chemistry* (USA).

The *British Journal of Nutrition* (15.73%) is the most frequently cited journal by the contributors to the same journal, the other periodicals cited in the order of rank being the *Journal of Nutrition* (USA), *Journal of Animal Science* (USA), *Proceedings of Nutrition Society* (U.K.) and *American Journal of Clinical Nutrition* (USA).

The authors who have contributed research papers to the *Indian Journal of Nutrition and Dietetics* have also cited the same journal to a large extent followed by the *American Journal of Clinical Nutrition* (USA), *Journal of Nutrition* (USA), *Indian Journal of Medical Research* (India) and *Cereal Chemistry* (USA). Thus, in all the three cases the source journals chosen from the respective countries are the most heavily cited journals by the contributors to respective journals. Hence, it can be ascertained that the nutritionists from these three countries are biased in their citation habits towards their respective national publications.

Table 3

Countrywise Distribution of Cited Journals

Country of Publication	No. of Titles	Percentage	Cumulative Percentage
U.S.A.	217	48.01	48.01
U.K.	73	16.15	64.16
India	34	7.52	71.68
Switzerland	23	5.09	76.77
Japan	16	3.54	80.31
Sweden	15	3.32	83.63
Netherlands	11	2.43	86.06
West Germany	9	1.99	88.05
Australia	8	1.77	89.82
Canada	8	1.77	91.59
France	5	1.11	92.70
New Zealand	3	0.66	93.36
Spain	3	0.66	94.02
Czechoslovakia	2	0.44	94.46
Denmark	2	0.44	94.90
East Germany	2	0.44	95.34
Hungary	2	0.44	95.78
Mexico	2	0.44	96.22
Netherlands	2	0.44	96.66
Poland	2	0.44	97.10
South Africa	2	0.44	97.54
Belgium	1	0.22	97.76
Columbia	1	0.22	97.98
Guatemala	1	0.22	98.20
Ireland	1	0.22	98.42
Israel	1	0.22	98.64
Italy	1	0.22	98.86
Kenya	1	0.22	99.08
Norway	1	0.22	99.30
Pakistan	1	0.22	99.52
Philippines	1	0.22	99.74
Rumania	1	0.22	99.96
Total	452	99.96	

Self Citations to Source Journals

7,848 references to journals were analysed further to find out the self citations to source journals. It was gathered that the self citation rate is relatively high in case of citations to the *British Journal of Nutrition* (15.73) and *American Journal of Clinical Nutrition* (13.89%) whereas *Indian Journal of Nutrition and Dietetics* has only 5.59% self citations to it.

Productivity of Cited Journals

With the intention of measuring the productivity of journals cited, a total of 7,848 citations

Table 4

Chronological Scattering of Cited Journals

Period or publication	Source Journals						Total No. of Citations	Cumulative No. of Citations	Percentage	Cumulative Percentage
	American Journal of Clinical Nutrition		British Journal of Nutrition		Indian Journal of Nutrition & Dietetics					
	No. of Citations	%	No. of Citations	%	No. of Citations	%				
1	2	3	4	5	6	7	8	9	10	11
1981	39	0.74	50	2.39	3	0.54	92	92	1.172	1.172
1980	413	7.93	106	5.08	19	3.43	538	630	6.855	8.027
1979	664	12.75	182	8.73	58	10.47	904	1534	11.519	19.546
1978	487	9.35	223	10.69	34	6.14	744	2278	9.480	29.026
1977	493	9.46	164	7.87	29	5.23	686	2964	8.741	37.767
1976	462	8.87	149	7.15	30	5.42	641	3605	8.168	45.935
1975	358	6.87	142	6.81	31	5.59	531	4136	6.767	52.702
1974	356	6.83	118	5.66	33	5.96	507	4643	6.460	59.162
1973	328	6.29	89	4.27	32	5.78	449	5092	5.721	64.883
1972	301	5.78	103	4.94	24	4.33	428	5520	5.454	70.337
1971	309	5.93	65	3.12	26	4.69	400	5920	5.097	75.434
1965-70	473	9.08	325	15.58	122	22.02	920	6840	11.722	87.156
1959-64	249	4.78	203	9.74	57	10.29	509	7349	6.486	93.642
1953-58	108	2.07	86	4.12	24	4.33	218	7567	2.778	96.420
1947-52	69	1.32	42	2.01	10	1.81	121	7688	1.542	97.962
1941-46	34	0.65	19	0.91	6	1.08	59	7747	0.752	98.714
1935-40	34	0.65	12	0.58	7	1.26	53	7800	0.675	99.389
1929-34	9	0.17	3	0.14	3	0.54	15	7815	0.191	99.580
1923-28	7	0.13	3	0.14	2	0.36	12	7827	0.153	99.733
1917-22	3	0.05	1	0.05	1	0.18	5	7832	0.064	99.797
1911-16	7	0.13	-	-	-	-	7	7839	0.089	99.886
1905-10	4	0.07	-	-	2	0.36	6	7845	0.076	99.962
1899-04	2	0.03	-	-	1	0.18	3	7848	0.038	100.000
	5209	99.93	2085	99.98	554	99.99	7848			

obtained from 452 journals were divided into four equal divisions of 1,962 citations each. It was observed that the first four journals of the rank list have highly pronounced rate of productivity. On an average each journal in the first group produced 590.5 articles. On the other hand the productivity of the journals belonging to the second, third and fourth group has decreased enormously.

Contry-wise Distribution of Journals Cited

It is clear from Table 3 that 48.01% of the journals cited by nutritionists are contributed from the United States, U.K., India and Switzerland having produced 16.15%, 7.52%, and 5.09% of journal titles respectively. Thus three fourths (76.77%) of the journals published in the field emerge from these four countries. The remaining 23.23% of the journals are published from the other 28 nations given in the list.

Chronological Scattering of Cited Journals

7,848 citations to journals have been arranged as per their year of publication (Table 4). The Table clearly indicates that 75.43% of the cited journal articles belong to the period 1971-81, the remaining 14.57% of the references were published during 1970 and earlier. It can be observed from the Table that the citations to journal articles have decreased with age backwards. The data also reveals that the scientists in the field do not use to a large extent literature which is more than 10-12 years old.

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ORGANISATION AND CONTROL OF PERIODICALS ON EXCHANGE: AN EFFECTIVE APPROACH

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INTRODUCTION

Scientific knowledge has no barriers and it is only through the exchange of publications any improvement in promoting R & D work is possible. It would be a misconception to regard it as merely of economic significance. On the contrary it is a beneficial proposition for both the parties similar in status getting together. It is of great significance for resource sharing, both from the receivers' and givers' point of view, considering not only cost but also the value of information gained.

Exchange of publications helps to promote international understanding and enhance the prestige of the nations concerned in the eyes of the advanced countries of the world.

Exchange involves sustained work and therefore requires careful handling so as to maintain good relationship with participating clients.

Exchange of publications depends upon several factors such as participating country's interest, subject of specialization and cost factor; and the publications offered should be of equal standard and scientific value. There is no need of a strictly-defined guideline for exchanges. The assessment of the volumes exchanged should not be based on the number of pages, periodicity or commercial price.

Procurement of periodicals on exchange is equally important as that on subscription. Hence regular follow up action for proper utility, evaluation, receipt, circulation, correspondence, replacement etc. are various important aspects necessary to make the exchange programme a success.

In this paper special reference is made to the practice followed in the Library of the Publications & Information Directorate (CSIR), Hillside Road, New Delhi-110012. On the basis of personal observations and experiences gained, a system by which inconsistancies can be minimised and entire exchange system of periodicals can be regularised in a systematic way is described.

EVALUATION

At the first instance, before entering into an exchange agreement with any party, the significance and utility of the periodical are ascertained either on the proposal of the requesting party or on the basis of any other source. After deciding the exchange to be established for the title of interest in lieu of the one to be sent, an exchange card is prepared.

SELECTION OF PARTIES

The first and very important aspect of exchange is selection of parties interested in the arrangement. The following sources can be of great assistance in this regard:-

(i) Titles of interest demanded by various project leaders/scientists.
(ii) Selection of periodicals from different sources e.g. publishers announcements, catalogues, reviews in journals and other sources such as:-

  a) Ulrich's International Periodicals Directory,
  b) World List of Scientific Periodicals,
  c) Serial Sources for the BIOSIS Data Base, and
  d) International Serials Catalogue (ICSU - A B).

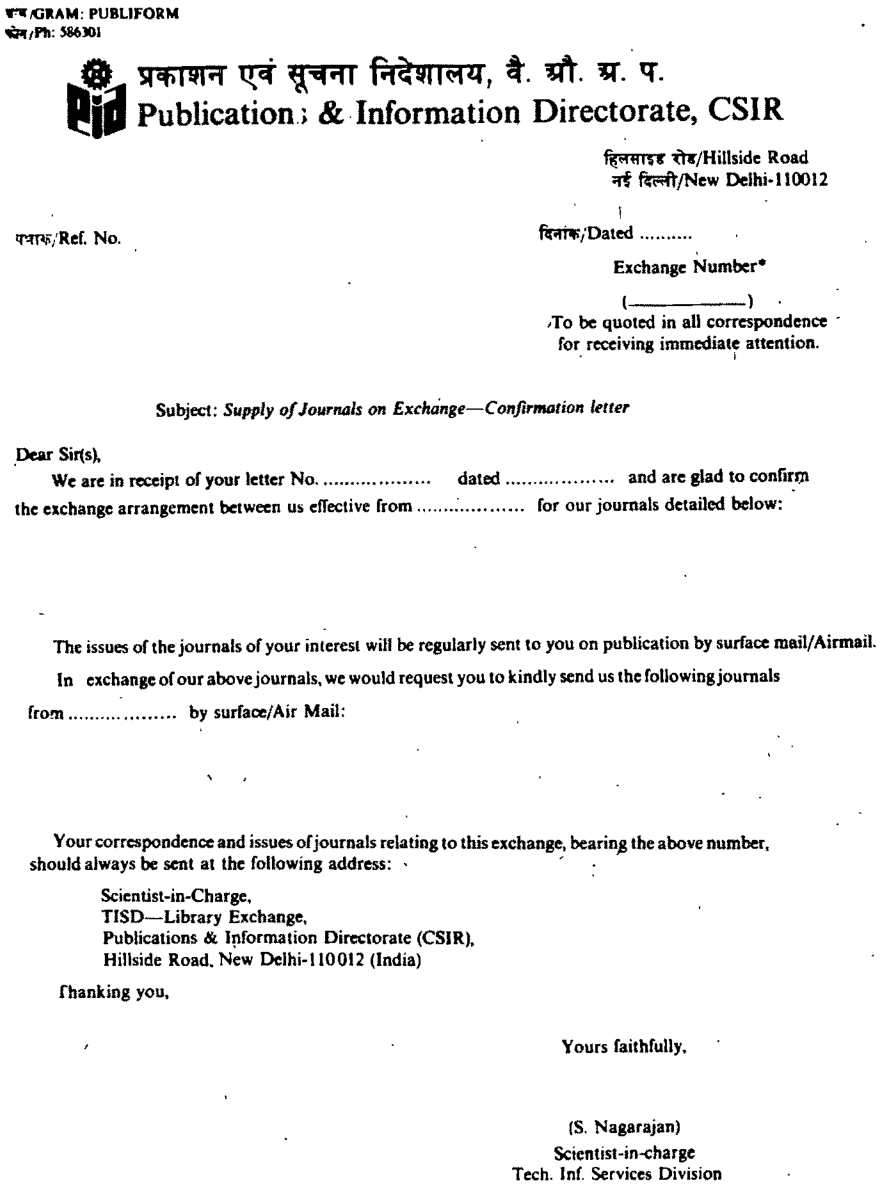
The organisation may also receive proposals for exchange from various other parties either through Unesco Journal of Information Science, Librarianship and Archives Administration or Handbook on the International exchange of publications by UNESCO.

After the usefulness and utility of the title are ascertained and approval for exchange is obtained from the competent authorities, confirmation letter for exchange (Figure 1) is sent to the party concerned for concurrence. It is worthwhile to keep on record the price, periodicity and volume of the journal. However this should not be the only criterion to decide on the exchange arrangement. Most suitable and agreeable method of establishing exchange is on equitable basis of the titles proposed for this arrangement.

DESIGNING OF MASTER INDEX CARD (MIC)

After the preliminary and necessary formalties of exchange arrangement are carried out, it is then very important to incorporate the details on the Master Index Card (MIC) (Figure 2 & 3).

The Master Index Cards (MIC) are then arranged in numerical order as per exchange number allotted to each party. The exchange numbers facilitate in expediting replies to various queries received from exchanging organisations.



तार/GRAM: PUBLIFORM
फोन/Ph: 586301

प्रकाशन एवं सूचना निदेशालय, वै. औ. अ. प.
Publications & Information Directorate, CSIR

हिलसाइड रोड/Hillside Road
नई दिल्ली/New Delhi-110012

पत्रांक/Ref. No.

दिनांक/Dated ....

Exchange Number*
(————————)
*To be quoted in all correspondence for receiving immediate attention.

Subject: *Supply of Journals on Exchange—Confirmation letter*

Dear Sir(s),

We are in receipt of your letter No. .... dated .... and are glad to confirm the exchange arrangement between us effective from .... for our journals detailed below:

The issues of the journals of your interest will be regularly sent to you on publication by surface mail/Airmail.

In exchange of our above journals, we would request you to kindly send us the following journals from .... by surface/Air Mail:

Your correspondence and issues of journals relating to this exchange, bearing the above number, should always be sent at the following address:

Scientist-in-Charge,
TISD—Library Exchange,
Publications & Information Directorate (CSIR),
Hillside Road, New Delhi-110012 (India)

Thanking you,

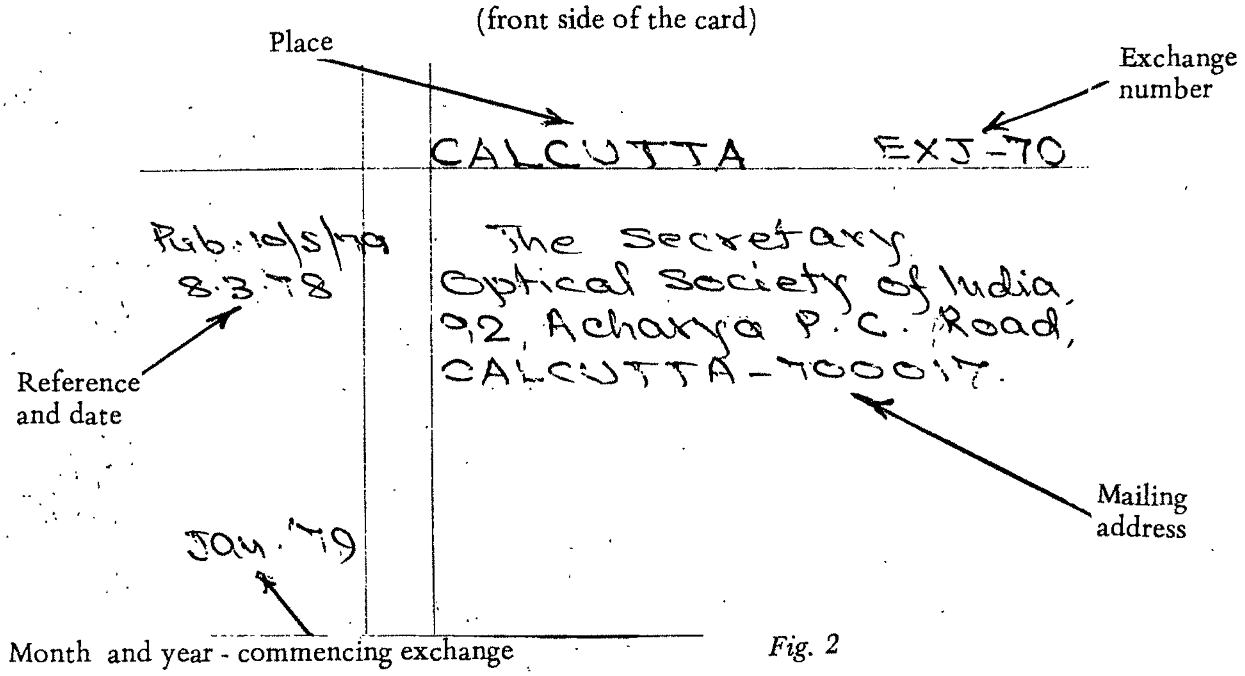
Yours faithfully,

(S. Nagarajan)
Scientist-in-charge
Tech. Inf. Services Division

Fig. 1

EXCHANGE OF PERIODICALS

(front side of the card)



CALCUTTA EXJ-70

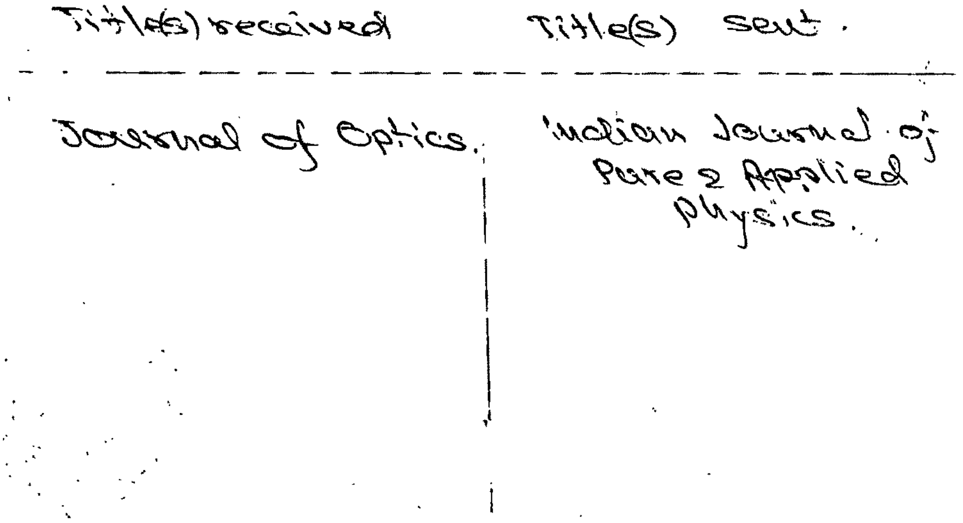
Pub. 10/5/79
8.3.78

The Secretary
Optical Society of India,
92, Acharya P.C. Road,
CALCUTTA-700017.

Jan. '79

Fig. 2

(reverse of the card)



Title(s) received	Title(s) sent.
Journal of Optics.	Indian Journal of Pure & Applied Physics.

Fig. 3

Auxiliary Index Cards (AIC): These are in no way different from the MIC. In other words these are the duplicate copies of the MIC with suitable heading of each auxiliary group on every card. These are filed under different auxiliary groups in the multidisciplined tray. The number of Auxiliary Index Cards (AIC) needed for the purpose is ascertained on the basis of various arrangements followed for smooth functioning of entire exchange work. The minimum possible number of cards required are discussed below:-

a) *Exchanging organisations:* These are filed alphabetically under sponsoring bodies.

b) *Periodicalwise:* In this tray there is a card for every title received under exchange and are alphabetically arranged. This helps the working staff to have a close link between Subscription cell, Receipt and Kardex cell if handled by more than one person at different places.

c) *Titlewise:* A card each for every exchanging partner is filed under individual title of their interest to be sent under the said agreement. The arrangement of cards in this group is preferred to be either under numerical order of the exchange number or country of origin of the parties. This helps in preparation and checking of addresses in regular mailing list for despatch of issues of journals.

d) *Countrywise:* Another group, where cards for each partner are arranged countrywise, helps in immediate response to many queries from either side.

e) *Receipt cell:* Periodicals which would be received under the exchange agreement are to be recorded in Kardex in the Receipt Cell. Hence a card for every title is alphabetically arranged for necessary entries in Kardex.

PREPARATION OF MAILING LIST

A list of addresses for each title which is due in the particular month is compiled and sent for despatch of the issues.

The entire operation especially preparation of addressograph plates similar to that of Master Index Cards, Auxiliary Index Cards and compilation of regular exchange mailing list are done on *BRADMA (British Addressograph Machine) in the Directorate.

PROGRAMMING PROCESS

Each of the month can be allotted for the following jobs for efficient working of the exchange:-

a) Attending to new proposals, confirmation of exchange agreed and filing of multidisciplined auxiliary index cards.
b) Despatch of replacement requests and correspondence in general.
c) Compilation of regular exchange mailing list and filing of papers etc.
d) Regular vigilance between receipt cell and exchange unit to avoid any discrepency.
e) Periodical reminders sent for non-receipt of copies.

In an effort to streamline the entire exchange programme of PID journals, revision work of the project was undertaken in 1978 on these lines. It is gratifying to note that it was a good success since then. As on today about 175 agencies from over 45 foreign countries and about 105 from India are participating in this programme. The library is now receiving over 550 titles in lieu of 12 PID journals:

Journal of Scientific and Industrial Research (Monthly).
Indian Journal of Chemistry - Sect. A (Monthly)
Indian Journal of Chemistry - Sect. B (Monthly)
Indian Journal of Pure & Applied Physics (Monthly).
Indian Journal of Technology (Monthly).
Indian Journal of Experimental Biology (Monthly).
Indian Journal of Biochemistry & Biophysics (Bimonthly).
Indian Journal of Radio & Space Physics (Bimonthly).
Indian Journal of Marine Sciences (Quarterly).
Indian Journal of Textile Research (Quarterly).
Research & Industry (Quarterly).
Medicinal & Aromatic Plants Abstracts (Bimonthly).

It is a matter of pleasure to put on record that the device has been efficiently working to the great satisfaction of the exchanging partners.

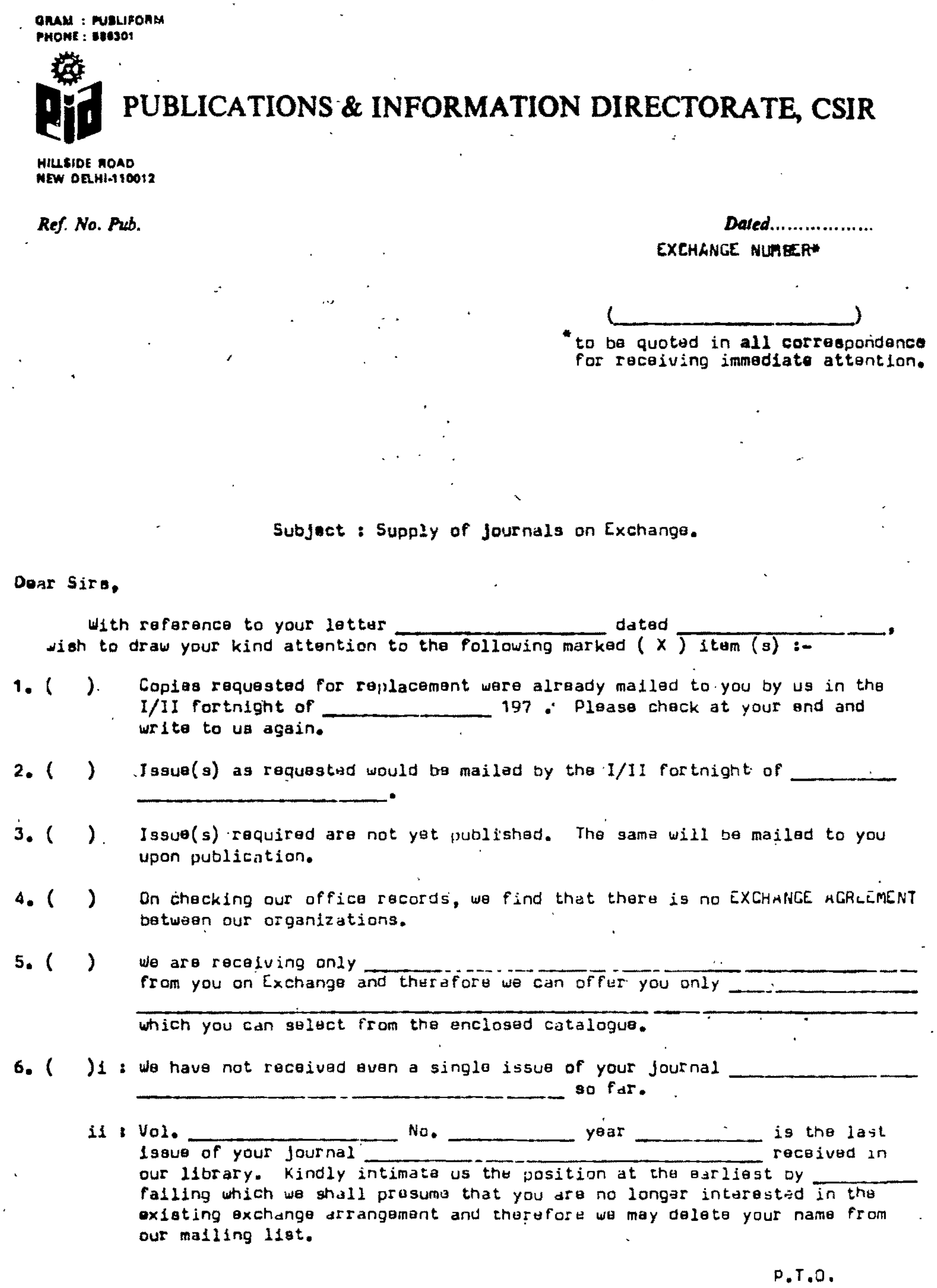
REFERENCE

Handbook of International Exchange of Publications: 2nd ed. ed & rev by Gisela von Busse. Paris: Unesco, 1956.

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to Sri S. Nagarajan, Scientist-in-Charge, Technical Information Services Division (T.I.S.D.) for his guidance and valuable suggestions for successful implementation of the system. I also wish to acknowledge Sri S.K. Malhotra for his constant technical assistance.

ANNEXURE - I



GRAM : PUBLIFORM
PHONE : 586301

PUBLICATIONS & INFORMATION DIRECTORATE, CSIR

HILLSIDE ROAD
NEW DELHI-110012

Ref. No. Pub. *Dated*..................

EXCHANGE NUMBER*

(______________________)

*to be quoted in all correspondence for receiving immediate attention.

Subject : Supply of journals on Exchange.

Dear Sirs,

With reference to your letter ________________ dated ________________, wish to draw your kind attention to the following marked (X) item (s) :-

1. ( ) Copies requested for replacement were already mailed to you by us in the I/II fortnight of ______________ 197 . Please check at your end and write to us again.

2. ( ) Issue(s) as requested would be mailed by the I/II fortnight of __________ ____________________.

3. ( ) Issue(s) required are not yet published. The same will be mailed to you upon publication.

4. ( ) On checking our office records, we find that there is no EXCHANGE AGREEMENT between our organizations.

5. ( ) We are receiving only ______________________________ from you on Exchange and therefore we can offer you only ______________ ______________________________ which you can select from the enclosed catalogue.

6. ( )i : We have not received even a single issue of your journal ______________ ______________________________ so far.

ii : Vol. ______________ No. __________ year __________ is the last issue of your journal ______________________ received in our library. Kindly intimate us the position at the earliest by __________ failing which we shall presume that you are no longer interested in the existing exchange arrangement and therefore we may delete your name from our mailing list.

P.T.O.

- 2 -

7. ( ) i : We would like to establish exchange arrangement for your publication(s) ______________________ and in return we are prepared to offer you ______________ ______________ any ______________ titles which you can select from the enclosed catalogue.

ii : We are unable to agree to exchange but request you to subscribe for other titles (if any) of your interest and correspond with the Sales & Distribution Officer of this Directorate in this connection.

8. ( ) We are returning your claim dated ______________ for incorporating necessary corrections i.e. title/vol./number & year. Since these appear to have been wrongly cited.

9. ( ) Your correspondence regarding Exchange should always be made at the following address :-

Scientist In-Charge,
TISD - Library (Exchange),
Publications & Information Directorate,
Hillside Road,
NEW DELHI-110012 (INDIA).

10.( ) ______________________________
____
____
____

Thanking you,

Yours faithfully,

Scientist In-Charge,
TISD - Library (Exchange).

Encl (s) : ______________
As above.

Annals of Library Science and Documentation 1985, 32(3-4), 135-136

BOOK REVIEW

Handbook of libraries, archives & information centres in India. V-1 – Libraries and archives/ editors – B M Gupta and others. New Delhi: Information Industry Publications, 1984/85. [Reviewed by B K Sen].

The Information Industry Publications, a newcomer in the field, has embarked upon an ambitious venture of bringing out a bulky publication in 5 volumes, encompassing a wide area of library and information science, viz. libraries and archives, information systems, services and programmes; and professional organisations in India.

The present volume deals with national level libraries; academic libraries; special libraries; and education, research and manpower, in 24 articles. Some of the articles are from the pen of the eminent librarians of the country.

Of the national level libraries, the National Library, National Medical Library, and IARI Library figure in this volume. It is surprising that the article on the National Library is by someone (Mr V K Jain), who has least connection with that library. But, Mr Jain has tried his best to do justice to the task entrusted upon him, gleaning material from secondary sources. The other two articles are by Mr M K Bhatt & Mr Chhotey Lal respectively. Apart from the history, objectives/functions, collection, service, etc., all the three articles provide a list of old publications available in the three libraries, enhancing the reference value of the articles. The omission of an article on the National Science Library is difficult to explain, especially when three of the editors are very much closely associated with the library.

Section two of the book, dealing with the Academic Libraries, comprises three articles. The article on university libraries in India by Mr C P Vashishth is an updated version of the article appeared earlier in the *Library Herald.* The article touches upon almost all the facets of the subject and can be considered one of the most important contributions in the book, and is also accompanied with a comprehensive bibliography on the subject. The articles on the college and school libraries in India are only general, to be precise, theoretical, bereft of any statistics or figures. An article on the agricultural university libraries would have been welcome.

The Section, Special Libraries, contains ten articles which are devoted to agricultural, medical, government, social science, museum, film, USIS, law, oriental and islamic studies libraries. The articles on agricultural libraries by S R Banerjee & S Moitra and government libraries by Inder Deo & S C Biswas dealt with history, objectives, types, and services rendered by the libraries. The former article also provides brief description of six important agricultural libraries and the latter, book collection, staff, library cooperation etc. The article on the social science research libraries and documentation centres is of good reference value, inasmuch as it has enumerated all the important libraries with their collection, described various services provided by them and listed documentation lists brought out by the organisations. In the article on museum libraries in India by Kishan, 18 museum libraries of the country have been enumerated and briefly described, besides budget, manpower needs etc. The article on law libraries by Satish Chander and H C Jain, is a lengthy one and provides information on various types of law libraries (e.g. State law libraries, high court law libraries, bar association libraries, etc.), and also brief description of several important law libraries. The article suffers from a great deal of redundancy which could have been pruned with benefit.

On Islamic studies libraries in India, Gulab Khan in his article has also enumerated and briefly described 14 libraries. As such, the article is of good reference value.

The last section (i.e. Section 4) deals with education, research and manpower. Articles in this Section have been contributed by quite a few stalwarts such as P B Mangla, T N Rajan, Krishan Kumar and others.

Two articles deal with research activities in the field. Prof. Krishan Kumar highlighted the classification research activities of Ranganathan and the school established by him, and P S G

Kumar provided a resume of doctoral research activities in this field going on in the country.

Three articles in this Section deal with educational aspects. Prof Mangla in his lengthy article (28 pp) dwelt on various aspects of library and information science education in India. The reference value of the article would have been greatly enhanced had a list of all the institutions imparting library and information science education in India been appended to the article. Other two articles on the topic cover continuing education (by V K Jain) and user education (by Krishan Kumar and P K Jayaswal).

Three articles, i.e., Professional Manpower from Library Schools in India: a Study of Enrolment and Out-turn by Shalini Rewadikar, Manpower Needs for Information Work in India by Prof T N Rajan, and, Demand for Information Scientists in India – an Analysis of Advertised Agencies by B M Gupta and others, are devoted to manpower. It would have been really worthwhile had all the three articles been consolidated into one.

The projected 5-volume handbook is supposed to perform the reference function more than anything else.

Any encyclopaedic publication requires a good deal of planning, sagacity in the selection of appropriate topics as well as capable writers for a balanced content of the publication. In this publication, deficiency is evident in all the three areas, which is obviously due to the inexperience and newness of the publisher. Being new in the field, most probably the publisher could not extract the writings from more capable writers, or get the best from some of the capable writers, who have contributed in this book.

It is also evident from the articles that the authors were not provided with specific guidelines, as a result each went in his own way.

Several shortcomings notwithstanding the usefulness of the publication as a reference tool cannot be overemphasised. Some of the articles will also be useful for B Lib/M Lib students.

It can be reasonably hoped that the type of shortcomings present in the book, will be greatly reduced or not be seen in the successive volumes.

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